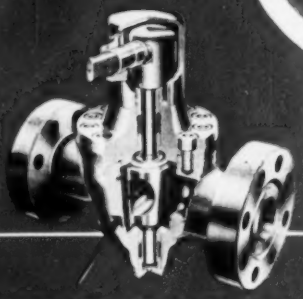
the OIL AND GAS JOURNAL

A REVOLUTIONARY APPROACH TO THE PROBLEM OF QUALITY VALVE DESIGN

THE *Cameron*

NON-LUBRICATED

LIFT-PLUG VALVE



SEPARATE, REPLACEABLE SEAT

An outstanding engineering triumph in this valve is its separate seat which: (1) May be easily replaced without removing the valve from the line; (2) permits any desired trim; (3) improves the tightness of the seat because an exterior portion of the seat is exposed to line pressure which forces it into tighter contact with the plug.

THE BEST FEATURES OF GATE, PLUG AND GLOBE VALVES COMBINED WITH EXCLUSIVE CAMERON INNOVATIONS

NON-LUBRICATED—No grease of any kind required to effect a seal; also reduces chance for human error and eliminates lubrication maintenance cost.

PRESSURE SEALING—When plug is seated, line pressure automatically forces seat into tighter engagement with plug.

UNIQUE LIFT-PLUG ACTUATOR—A novel mechanical design which lifts, turns and reseats plug in continuous turn of a lever.

RENEWABLE SEAT AND PLUG—Easily replaced, permits any desired trim.

FIELD REPAIR—Can be completely overhauled without removal from line; no special tools or skill required.

EASY OPERATION—Requires less operating effort than other valve designs.

FORGED STEEL—All parts, including body, are press or drop forged from specification materials.

A descriptive bulletin will gladly be sent to interested operators on request.

CAMERON IRON WORKS, INC.

P. O. Box 1212 HOUSTON, TEXAS

Export—74 Trinity Place, New York, New York

PRICE 50 CENTS

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MARCH 30, 1950

HOWCO
IMPROVED
5 W.T PLUGS
HOWCO BULK CEMENTING
HOWCO ROTO-WALL CLEANERS
HOWCO
CENTRALIZERS
HOWCO
FLOATING
EQUIPMENT
OIL WELL CEMENTING
IMPROVED
CASING CEMENTING
A highly critical moment in the drilling of any well is the important operation of the cementing of casing. It's a universally accepted fact that Halliburton has revolutionized cementing practices on casing strings. Improved operations are now possible because of HOWCO Roto-Wall Cleaners, improved Floating Equipment, Gel Cements, New-Type 5-W Plugs and better cementing equipment in general. Halliburton, as a pioneer in this field, takes pride in its many successful contributions to oil well cementing. HOWCO improved equipment and techniques result from a continuous program of research, scientific advancement and enterprise. Thus another success story proves why HOWCO continues to maintain leadership in equipment and service.
962

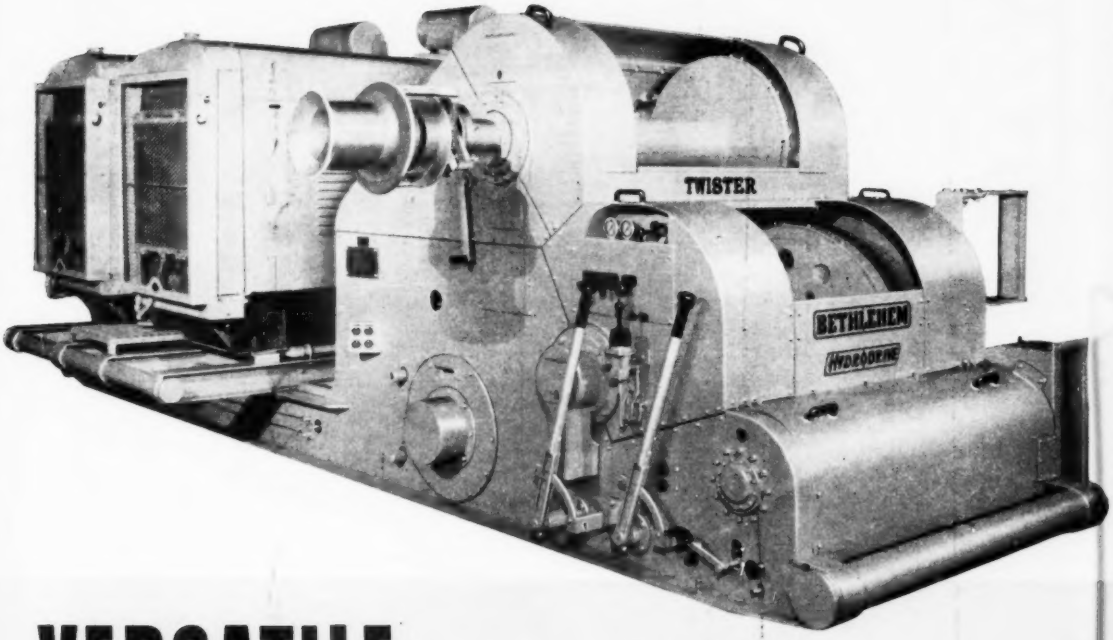
SUCCESS STORY!

by HALLIBURTON

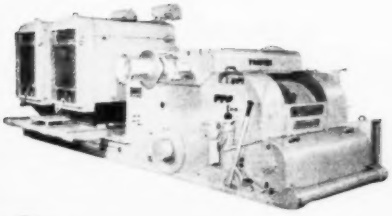
HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

THE BETHLEHEM *HYDRODRIVE* TWISTER



VERSATILE... *and satin-smooth*



For drilling depths ranging from 5,000 to 7,000 ft, and for deepest workover jobs, we spotlight the Twister—give it the full beam with enthusiasm. This is a rig equipped with the smoothest, most shock-free hydraulic drive we have ever offered; a rig completely air-controlled, and so simple to run that the driller can master it in no time at all.

Its smooth flow of power reduces maintenance on clutches, shafts, sprockets, chains, and other moving parts. Shock-loading of drill pipe and other working tools is virtually impossible.

Hydraulic torque-converter drive makes available an infinite number of speeds on the rotary table—and, of course, a full range of drum speeds without constant shifting.

The Twister has many talents. So responsive is the power, so thoroughly under control, that drilling is made easier; workover jobs speeded up. And you should see the gentle way it raises and lowers those portable masts!

Out in the field, where Twisters have been in service for more than a year, there are some mighty pleased owners. It will be worth your while to investigate the reasons.

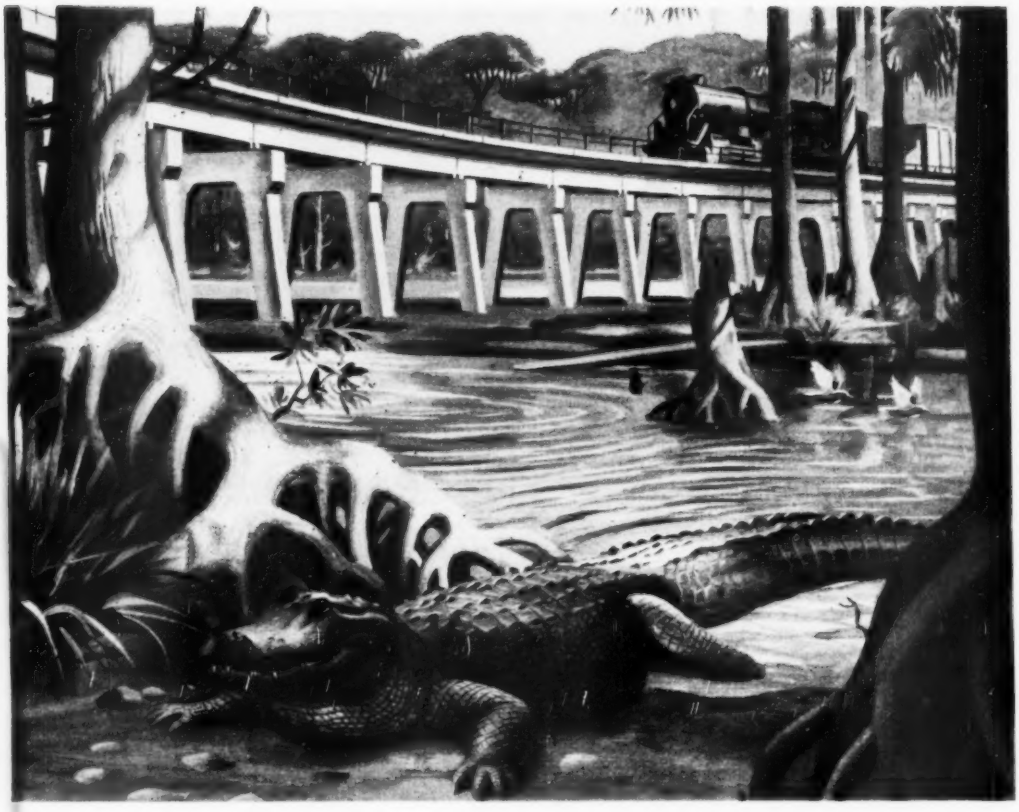
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second Street, Tulsa, Okla.

Subsidiary of Bethlehem Steel Corporation

On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California

BETHLEHEM STEEL



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If you are planning an industrial project in the Southwest, your organization may well profit from Brown & Root's thirty years' experience in Southwestern building.

Meeting the unique challenges offered by soil, climate, and terrain of this area, requires specialized techniques . . . know-how acquired only through years of Southwestern development.

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You get MORE CAPACITY with a FANMIX BURNER

Increase Boiler Ratings On Present Or Planned Equipment

In all types of Coppus-Dennis FANMIX Burners — straight gas or combination gas-oil — we utilize the energy of the fuel under pressure to drive the burner fan and deliver air in the proper proportion to the fuel flow. This exclusive "pinwheel action" *mechanically* mixes fuel and air in exactly the right proportions for truly radiant, non-luminous heat.

The result is uniform temperature everywhere in the combustion chamber — no drifting "hot spots" — and complete combustion under all conditions. That's why you can release more heat into your present furnace — why in new installations you get more heat into smaller furnace space.

FANMIX Saves On Both Old and New Installations

FANMIX can easily be operated with your present furnace and stack, requiring only minor changes in other equipment. Or if you're planning on new boilers, remember that FANMIX relieves the furnace from the burden of mixing, creates its own forced draft and takes smaller pipe sizes. Which means you can plan on reduced combustion space, less stack, no forced draft equipment and lower installation costs all around.

Get the Whole Story

Coppus engineers FANMIX Burners to meet individual requirements, providing complete control over heat pattern and combustion . . . Learn more about how "pinwheel action" can step up *your* boiler performance to peak efficiency and economy — as it is doing throughout industry. Send for Bulletin 410-6. Coppus Engineering Corp., Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" Products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, and MINING CATALOGS.

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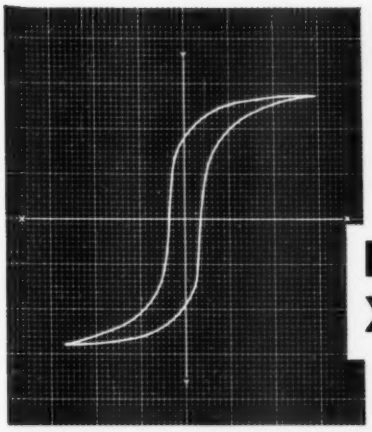


NOW you can plot X vs Y... automatically

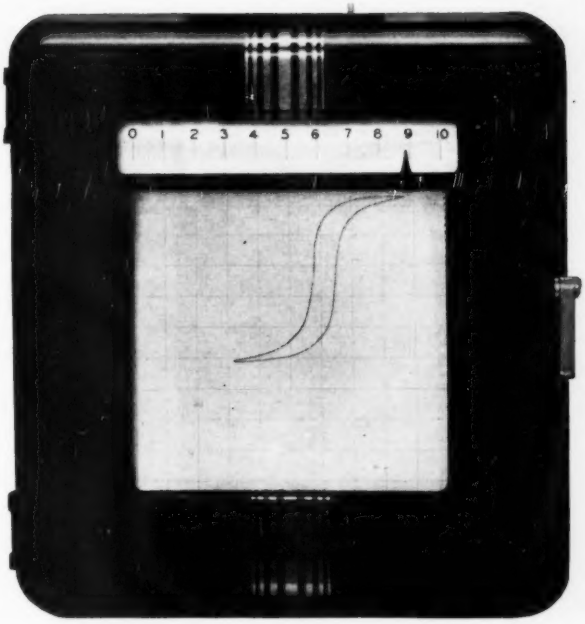
A new Speedomax Recorder . .

now automatically plots the relationship between two variables, showing one as a function of the other. Tedious compilation and manual plotting by experienced personnel are eliminated. Instead, the variables to be plotted are converted to d-c signals, and connected to the instrument, one to the horizontal axis and the other to the vertical axis. The result is a permanent record, accurately plotting in minutes data that would require hours using the point by point method.

As compared to the usual recorder, which has only one measuring circuit and a constant speed non-reversing chart paper drive and which plots a variable as a function of time, this new recorder has two measuring circuits. Pen travel (X axis) is controlled by our well known Speedomax G vacuum tube circuit. A similar circuit controls the chart paper drive, (Y axis) and makes it reversible. Thus, the new recorder makes it possible automatically to draw curves such as the hysteresis loop shown, temperature vs temperature difference, stress vs strain or other two-variable curves.

Response of the instrument is amply fast. The pen takes only 3 seconds for full scale travel of $9\frac{7}{8}$". Full chart travel is 10" and requires 4 seconds. Standard minimum voltage for full travel of either coordinate is 10 mv.

For further information, write to Leeds & Northrup Company, 4959 Stenton Avenue, Philadelphia 44, Pennsylvania.



Standard minimum range is 10 mv d-c for full deflection of either function.

Two electronic circuits—one for each function.

Large chart: about 100 square inches.

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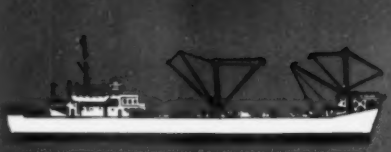

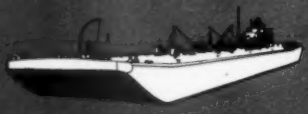

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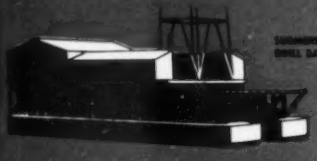
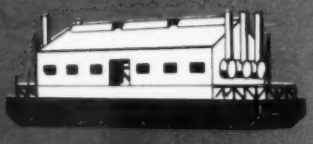
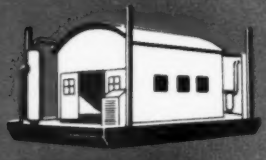
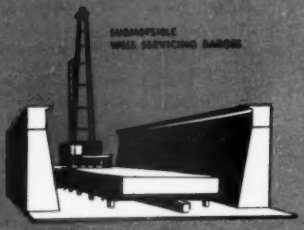
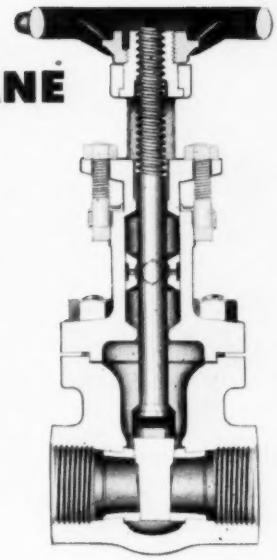








Everything for your piping job ...from one complete line–CRANE



No. 3609A, 600-Pound Steel Gate, Monel trimmed. Sizes: up to 2-inch.

YOUR FIRST CHOICE FOR HYDROFLUORIC ACID

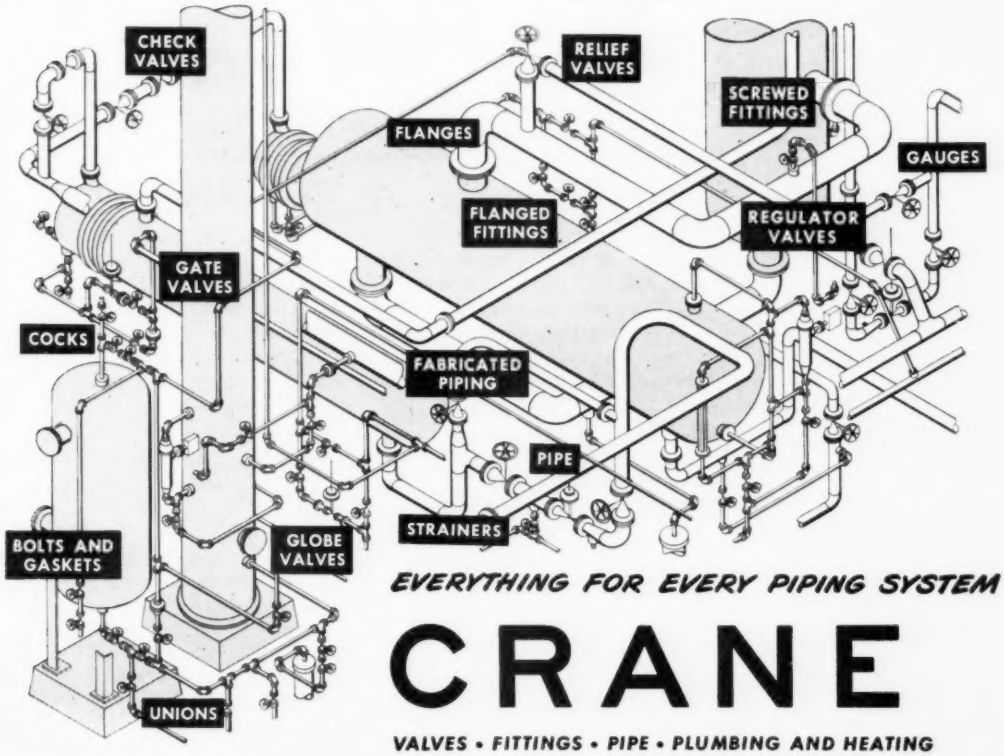
Once you've tried these valves on hydrofluoric service, you'll take nothing less. Made in sizes from ¼ to 2 in., Crane Monel-trimmed 600-Pound Steel Gates and Globes combine the newest features for safe and efficient control of hydrofluoric lines.

For example, note the specially designed extra deep stuffing box equipped with packing spacer, and with a plug opening for proper lubrication of upper and lower packing. Note the heavy body section and husky bonnet joint flanges. A soft iron gasket assures positive tightness; male-and-female faces prevent gasket blowout.

All sizes in this Crane line have outstanding service features. Threads in screwed ends are extra long. Flanged ends have large raised male face with concentric groove finish for leak-proof end connections. See page 377 of your Crane No. 49 Catalog.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE ORDER TO CRANE SUPPLIES ALL PIPING EQUIPMENT FOR THIS HYDROFLUORIC ALKYLATION UNIT, FOR EXAMPLE



EVERYTHING FOR EVERY PIPING SYSTEM

CRANE

VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

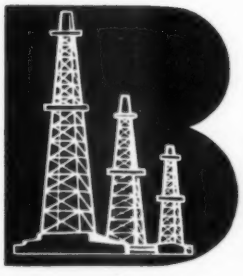
Another Job for AQUAGEL

Drilling takes a lot out of drilling mud. Mud loses solids by adhering to cuttings, building filter cake, and, on occasion, in losses to the formation. These losses must be replaced if the mud is to perform efficiently.

Thousands of operators follow the simple practice of maintaining their mud's solids content by regular additions of the best of the gel-forming colloidal materials: Aquagel. Such an addition replaces lost solids with active colloidal material. The practice results in the cheapest and most effective drilling mud insurance money can buy. Aquagel in drilling mud improves its performance, lengthens its life, and extends the footage of trouble-free drilling.

Operators choose Aquagel not only because it is the standard of all the bentonites, but because they have figured, on a mathematical basis, that Aquagel gives them a better break. Mined from larger deposits of the world's finest bentonites, it is processed under strict controls to remove impurities and to produce an absolutely uniform powder which disperses readily, builds a thin, tough, impermeable filter cake, holds down water loss, and provides excellent lubrication to bit, drill pipe and pumps.

Give *yourself* the breaks by conditioning *your* mud with Aquagel, the industry's standard of excellence.



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Your Baroid Man will be glad to advise you on how to get the best results with Aquagel

BAROID COMPLETE DRILLING MUD SERVICE

BAROID SALES DIVISION NATIONAL LEAD COMPANY
LOS ANGELES 12 • TULSA 3 • HOUSTON 2

20,810 hours without a major overhaul...

Spike Fagans, Drilling Superintendent for W. D. Kelley says of his Murphy Diesels, *"Have had exceptionally good service out of our Murphy Diesels and still are. When we buy a new rig it also will be powered by Murphy Diesels. In oil field language, it is a hell of a good engine. When total costs are considered, I do not believe they can be beat."*

The two Murphy Diesels referred to above by Spike Fagans have drilled 61 wells with a total footage of 188,110'. Each engine has operated for 20,810 hours without a major overhaul. All the drilling has taken place in the panhandle country around Pampa and Borger, Texas.

Wherever they are used in the oil fields, Murphy Diesels are piling up impressive records for dependability and economy. Their rugged, heavy-duty construction enables them to make more hole faster, at lower cost with less down time.

Get full details from your Murphy Diesel Dealer or write direct.

MURPHY DIESEL COMPANY
5305 West Burnham St., Milwaukee 14, Wisconsin
FACTORY BRANCH — Sales, Parts and Service:
113-117 South Elwood Street, Tulsa, Oklahoma

for a pair of MURPHY DIESELS on W. D. Kelley's rig near Pampa

MURPHY DIESEL

Heavy duty power

for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipeline pumping, 90 to 220 H.P. Diesel-Electric generating Sets 60 to 133 K. W.

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MY-LO-JEL . . . AN UNMODIFIED BLENDED STARCH . . . HOLDS WATER LOSS DOWN LONGER BECAUSE ITS PURITY PRODUCES A FAR TOUGHER STARCH

Magcobar My-Lo-Jel is an improved pregelatinized drilling mud starch in the form of a free flowing powder which can be added directly to the mud through a hopper mixer. My-Lo-Jel provides positive control of the filtration properties even in the presence of salt, anhydrite and other contaminants. It is a blended starch . . . blended from premium type corn . . . that is especially processed to produce a quick acting, tough and chemically stable plugging agent to inhibit filtration of mud. Thus, it not only lowers water loss, but keeps it low.

My-Lo-Jel is easy and economical to use . . . and you pay no premium for Magcobar's premium quality drilling mud starch. So look for the Magcobar dealer sign when you need mud. There are more than 250 Magcobar dealers strategically located throughout the oilfields to give you immediate delivery of My-Lo-Jel and other dependable drilling muds and chemicals.

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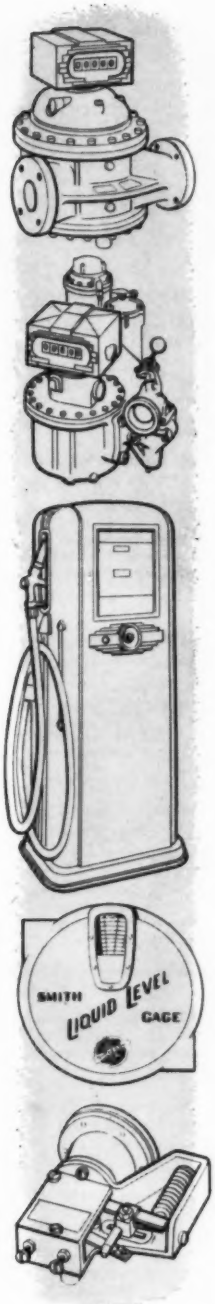
HOUSTON, TEXAS MALVERN, ARKANSAS
Export: Daniels, Beckley and Associates
30 Rockefeller Plaza New York, N. Y.

My-Lo-Jel can take the place of protective strings! So why take chances with tight holes due to filter cake when low water loss muds made with My-Lo-Jel can hold down the cost of drilling by eliminating strings of protective casing, preventing delays due to reaming, hole trouble and fishing jobs!

LOOK FOR THIS SIGN WHEN YOU NEED MUD

MAGCOBAR • MAGCOGEL • HIGH YIELD DRILLING MUD • XACT CLAY • FIBER-SEAL • MAGCO-MICA • TANNATHIN • JEL-OIL MUD • JEL-OIL "E" • SALT GEL • NOHEEV • SEAL FLAKES • MY-LO-JEL • CHEMICALS

Magcobar
Complete
DRILLING MUD SERVICE
DEALER



...allow me to present my family

It's a big family so there's not enough room to show all members. But those you see are representative. Here is a family devoted exclusively to the measurement of petroleum products. There's something about specializing. You get accuracy of measurement and *more*. You get functional products, designed *right*, made *right* and operating *right*. It all adds up to long life, dependable service.

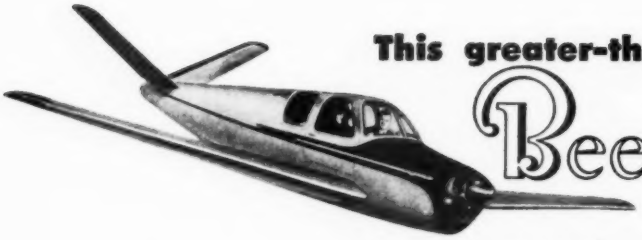
Sorry we can't show you "old 1001," the great grand daddy of all Smith Meters. He's out making deliveries right now on a tank truck. Incidentally, this is his *third* truck—he's outlived two others. More about him later.

A.O.Smith
Corporation
METER DIVISION

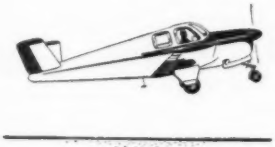
FACTORIES • 5715 SMITHWAY ST., LOS ANGELES 22, CALIF. • P. O. BOX 500, SUCCASUNNA, N. J.

Sales Offices: New York, Chicago, Houston, Los Angeles. *In Canada:* Toronto, Vancouver.
International Division: Milwaukee 1, Wisconsin. Local Agents in All Principal Cities.

Reading down, **METERS**—*Three different groups—Model S-30, illustrated at top, is for loading racks, refineries and line pipe. Model T meters for trucks and Model M meters, not shown, for high pressure work (up to 2000 psi) at wells, in refineries. For each type, there's a wide variety of counters, totalizers, printers, dials, etc., available.* **GASOLINE DISPENSING PUMPS**—*Low models, high models. Computer and non-computer types. All feature unit replacement plan for constant service at minimum cost.* **GAGES**—*Automatic tank gages. Direct reading types, as illustrated and remote indicating types for central office control of entire tank farms.* **ACCESSORIES**—*Many related metering accessories, such as flow rate controllers, automatic set stops, temperature compensators, deaerators, etc. Newest accessory is the* SMITHway *engine controller, illustrated at bottom, which saves time, steps, and engine rpms in truck-tank deliveries.*



This greater-than-ever Beechcraft is a better-than-ever value!

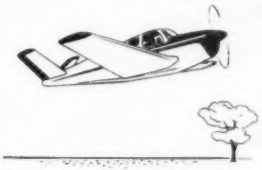


Increased Horsepower Rating at Take-off

Take-off horsepower rating is now 196 hp at 2450 rpm, providing improved take-off performance without sacrifice of long engine life, low operating and maintenance costs.

Increased, Faster Flap Travel, New Beechcraft Propeller

Improved short field take-off and landing performance is made possible by greater degree of flap travel and the greater static thrust of the new Beechcraft propeller.

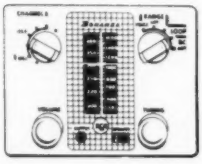


Faster Landing Gear Action — Both Up and Down!

The already quick action of the Bonanza's retractable tricycle landing gear has been speeded up even more. At 105 mph the gear lowers in 7½ seconds, goes up in 8½ seconds!

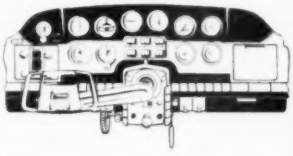
New Upholstery Combinations and Interior Designs

New combinations of blue, green and brown materials of warmth and beauty especially chosen to blend with the new range of exterior colors. Smart leather seat caps, new arm rests for all passengers.



New Radio Includes VHF Marker Beacon

The selection of the RCA 116 transceiver as standard equipment provides regular low-frequency operation for navigating four-course radio range, homing on range and standard broadcast stations; adds VHF channels.



New Instrument Panel Design, Safety-Type Wheel

New instrument panel design retains famous Bonanza operating convenience and efficiency, adds smarter-than-ever note to cabin appearance. And there's a new safety-type control wheel to match!

It has no equal in performance, speed, economy, strength, safety, style and comfort!

The new B35 Beechcraft Bonanza exceeds all promises for a speed-with-economy plane that's roomy, comfortable and easy to fly! New performance features at moderate horsepower add to its versatility and safety, hold operating and maintenance costs at a *business economy* level! New operating conveniences and luxury appointments plus scores of refinements call for a personal inspection because there's room here to show only a few. See it! Get all the facts! You'll agree this greater-than-ever Beechcraft Bonanza is a better-than-ever value!

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles
Fuel economy, 9.5 gph

Get all the facts! There are hundreds more — about the extra advantages of the new Model B35 Beechcraft Bonanza. Check with your nearest Beechcraft distributor or dealer, or write for complete information on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Beechcraft BONANZA

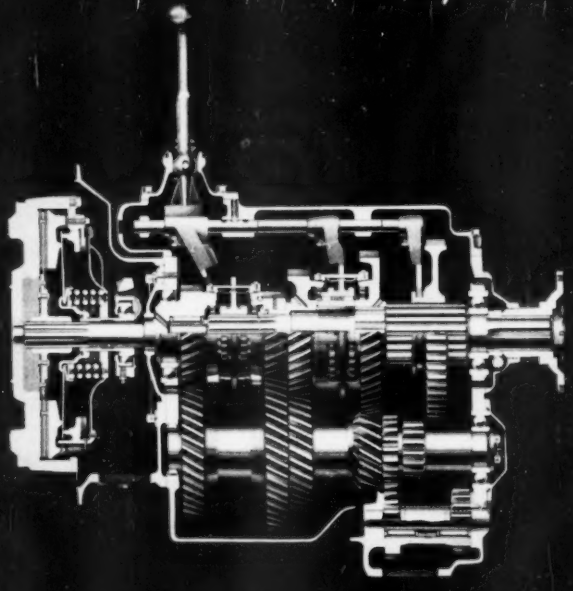
BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Simple in design

Simple in operation

Efficiently engineered for all driving conditions

Spicer *Fully* Synchronized Transmission



Moving more tons at less cost per mile, with increased driver comfort and efficiency, are important functions being rendered daily in thousands of Spicer *Fully* Synchronized Transmission applications. Its advantages include:

Fully Synchronized in All Speeds but "First"
Faster Shifts — **No Missed Shifts**
Fast Getaway — **No Lugging of Engine**
Less Vehicle Slowdown When Shifting
Shifts Made Without Slowdown for Double-Clutching
Shifting Lever Travels Same Distance Every Shift
Fuel Savings — **Lower Vehicle Upkeep**

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Spicer
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Report No. 8

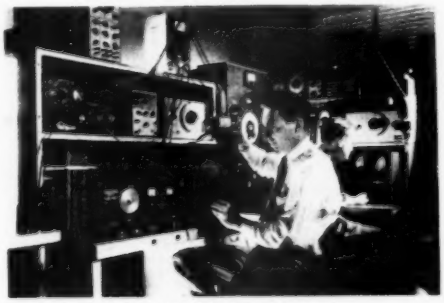
8. To build a laboratory, production plant, and home office to serve as a nucleus for the accomplishment of our objectives.

A modern 40,000-square foot fireproof building in Dallas' unique industrial park has been our home for more than three years. Here we have provided the most modern facilities for production, design, and testing of seismic equipment.

ELECTRONIC PRODUCTION SHOP

HEAVY EQUIPMENT SHOP

You'll always be welcome here, so when you're in Dallas come by and find out what the GSI plant and people can do for your exploration needs.



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MAIN PLANT: AVONDALE, LA.
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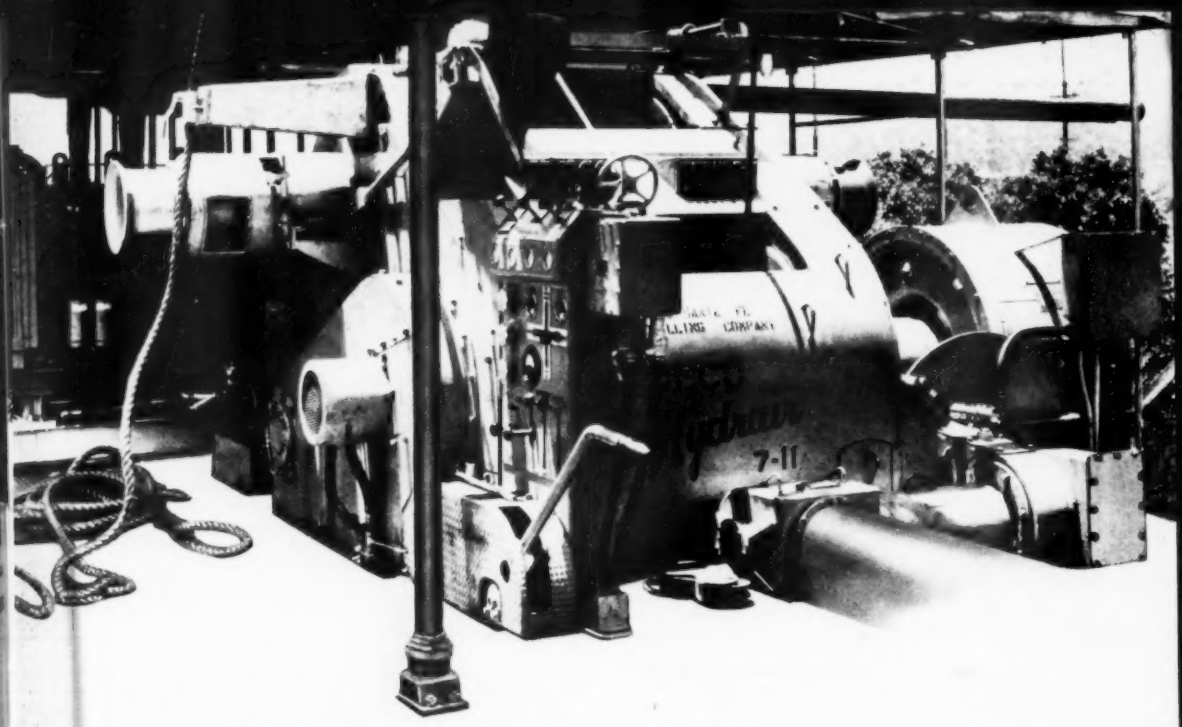


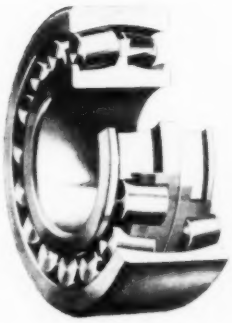
backing up a 25-ton line pull

TORRINGTON SPHERICAL ROLLER BEARINGS

In IDECO's Hydrair 7-11 Rig, heavy loads on compound, transmission, drum and cathead shafts are handled smoothly and efficiently by Torrington Spherical Roller Bearings.

The large area of roller-to-race contact is uniformly maintained and shafts turn freely even when momentary overloads cause deflection.

These features of heavy-duty Torrington Spherical Roller Bearings assure long service life with minimum maintenance. Our engineers will welcome an opportunity to help you secure these advantages for your product.



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SPHERICAL ROLLER · TAPERED ROLLER · STRAIGHT ROLLER · NEEDLE · BALL · NEEDLE ROLLERS

NEW, SUPER TOUGH DRILLING HOSE STOPS *"BLOW-OUTS"*; *KEEPS YOUR RIG ON THE JOB*

The tube in this hose is actually tougher than steel—when it comes to resisting abrasion. It's made of B. F. Goodrich *Armorite*. When used to line gravel chutes it often lasts sixteen times as long as heavy steel plate! Cover of Highflex Drilling hose is made of the same material.

Highflex is reinforced with a double ply of high tensile strength cable wire. Eight plies of extra heavy duck. No more worries about hose "blowouts", shut-down time, or damage to drilling rig and injury to crew. Highflex takes extreme bottom hole pressures, qualifies for Grade C (5,000 pounds) test pressure, A.P.I. Resilient—quickly recovers from shock. Ends are reinforced with additional plies of wire and fabric to stop bending stresses at coupling.

Uncle Sandy THE UNITED SUPPLY MAN

UNITED SUPPLY
AND *Manufacturing* COMPANY
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Stores in Kansas, Oklahoma, Texas, Louisiana, and New Mexico

PIPE DREAMS COME TRUE

U. S. Rubber Company experts solve any rubber pipe or hose problem... no matter how unusual or difficult

LAYING DOWN ON THE JOB! It takes only 25 seconds for the helicopter to lay this 400-foot pipe line. The hose, developed by United States Rubber Company, is folded into a special container and released at the press of a button. Its civilian and military uses are almost infinite.

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SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

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Here is a streamlined, six-speed, friction-clutch unit designed for drilling to 7,500 feet, and re-working the deepest wells. The U-15 has stood the test of time in oil fields throughout the world, and is known for efficient, reliable, and economical operation.

One lever controls all six speeds to drum and table. Throttle controls all engines.

Interchangeable sprocket on rotary table widens "6 speed" range.

One rotary clutch pedal for engagement and disengagement, with automatic lock.

Heavy guards protect the rotary table drive sprocket and the rat-hole digger. Choice of spudding cathead or Unitrig's standard cathead.

Wide pipeline hitch on both sides of skid — popular with truck drivers.

Ask your supply store, or write for complete information on the U-15.

UNITRIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB....

Exclusive Export Representative
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ONLY W-K-M Valves have a round, full opening passage with the same I. D. as the pipe. This design eliminates turbulence and permits free passage of scrapers.

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It is significant that most of the World's *big* pipelines are tied together with W-K-M Valves. The superior performance that led to their use on these jobs will lead you to specify them for your next job when you investigate their exclusive design and operating advantages.

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...PRECISION BUILT...FIELD PROVEN

Bingham Stuffingboxless Pumps

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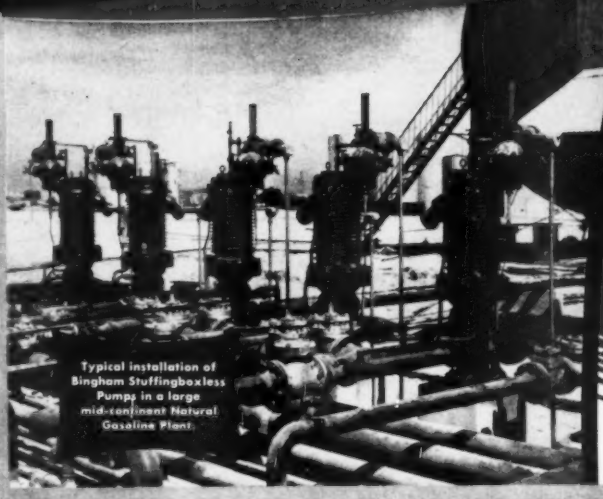
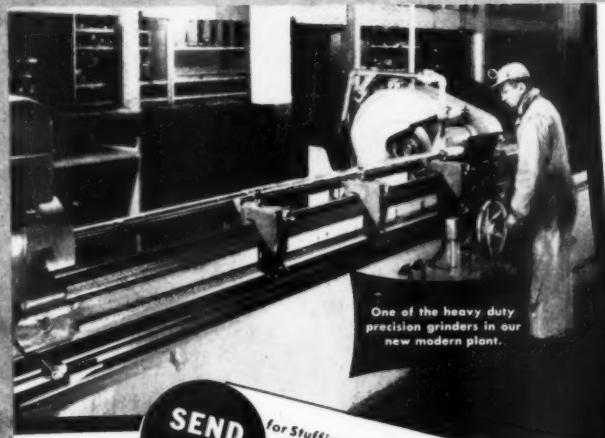
For the above reasons, Bingham Stuffingboxless Pumps are especially adapted for and are giving exceptional service in many types of industry such as *Oil Refineries, Synthetic Rubber and Plastics industries, Natural Gasoline plants, Pipeline Booster stations, Terminal and Storage Tank Farms, Chemical plants, Food Processing industries and other industrial applications.*

● ● ●

Bingham Stuffingboxless Pumps, like all Bingham products, are precision built. All parts requiring close tolerances are ground on heavy duty precision grinders.



Typical installation of Bingham Stuffingboxless Pumps in a large mid-continent Natural Gasoline Plant.



One of the heavy duty precision grinders in our new modern plant.

SEND NOW for Stuffingboxless Folder No. 107

Lists 12 important reasons why you can profit by using Bingham Stuffingboxless Pumps. Write, wire, or phone the Bingham Sales and Service office nearest you.

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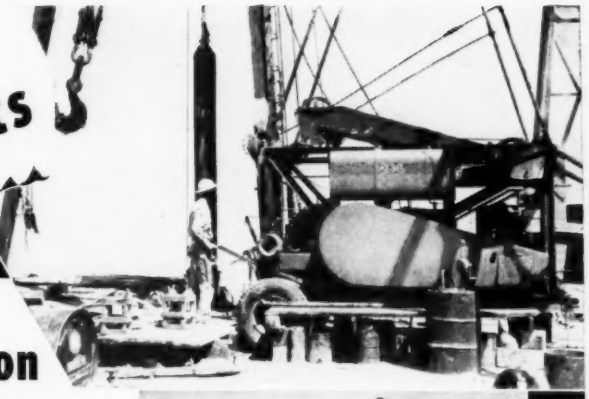
R_x for Oil Field Profits



BUCYRUS ERIE Spudders on Top-to-Bottom Drilling

In drilling from grass roots to pay formations, you can chalk up extra profits by using Bucyrus-Erie spudders. These easy-handling, durable machines combine big capacity with an effective drilling motion for fast penetration in all formations with no loss-of-circulation worries. With Bucyrus-Erie spudders your fishing jobs are few, too, because you can raise and lower tools at will—there's no time-consuming temper screw adjustment. On the whole range of oil field jobs, from spudding-in to completion, they give you low cost efficiency.

For complete details on the entire line of Bucyrus-Erie spudders, see your nearest distributor today. Models are available for drilling as deep as 6000 feet.

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Distributors in All Principal Oil Fields • Drill Sales Division Offices: Dallas, Tex., Evansville, Ind., Englewood, N.J.

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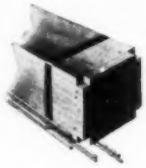
use the best!



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No. 6 CM Steel
No. 28 (Pat.) Columbium-Bearing Stainless Steel
No. 32 CMS (Pat.) Steel
No. 7 Drawn Iron (Copper Coated)
No. 25M Bronze
No. 25M (Pat.) Flux-Coated Bronze
No. 31T (Pat.) Bronze
No. 19 Cupro
No. 26 Everdur Bronze
Tobin Bronze
No. 23 Drawn Aluminum
No. 14 Drawn Aluminum
No. 9 Cast Iron

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3/16-in. 1-Braid Acetylene
1/4-in. 2-Braid Oxygen
1/4-in. 2-Braid Acetylene
3/8-in. 2-Braid Oxygen
3/8-in. 2-Braid Acetylene
3/16-in. 1-Braid Rayon Fitted Hose
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"OXWELD" GOGGLES...provide maximum eye protection for all oxy-acetylene jobs.

No. 16, adjustable eye cups shaped to fit comfortably.
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Special flatground, polished lenses conform to all safety codes.

We have these **OXWELD** welding supplies, too . . .

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The GUIDE tells all about "Design Horsepower" and Speed Ratios —and by merely *scanning* a page of GUIDE designs which use the *stock pulleys* that meet your needs, you can quickly determine the center distances that will fit your equipment layout while, at the same time, enabling you to use *standard belts!*

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The GUIDE is compiled and written by Gates Engineers. It embodies their specialized knowledge gained through operating the largest V-Belt testing laboratories in the world! Here, an average of *32,000 hours* of testing *per week* are run on V-Belts alone! No wonder the Gates "GUIDE for SELECTING or DESIGNING V-BELT DRIVES" is regarded by Engineers as the *authority* on V-Belt Drive design.

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Eng. 501

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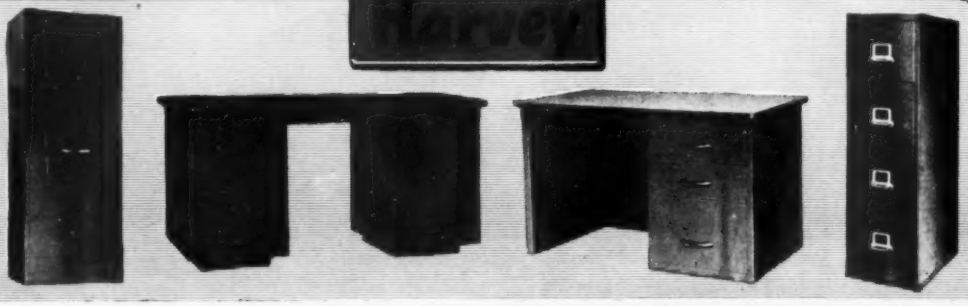

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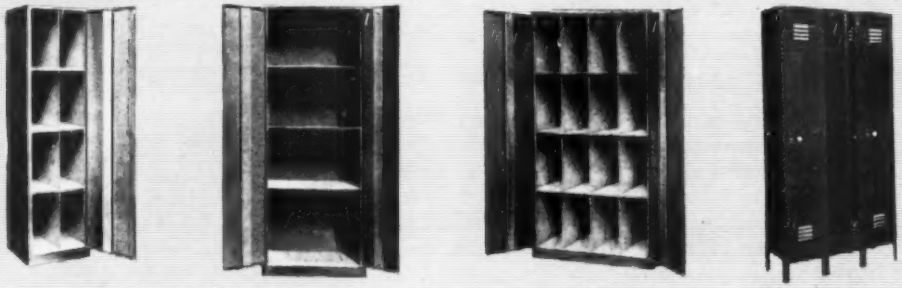

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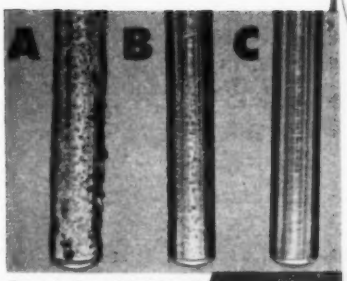
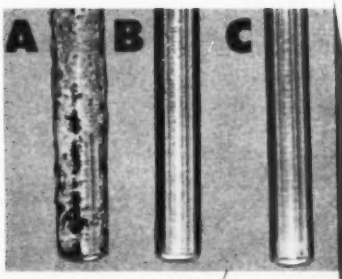


Concentrations of Santolene C in [illegible] are as follows: (A) No Santolene C, test failed; (B) 10 ppm. Santolene C effective, but test failed; (C) 20 ppm. Rust absent. Test passed.

test Monsanto SANTOLENE C

SEE HOW IT CAN STOP RUST IN YOUR LINES AND TANKS



Concentrations of Santolene C in tests with fuel oil are as follows: (A) No Santolene C, test failed; (B) 10 ppm. Santolene C effective but test failed; (C) 20 ppm. Rust absent. Test passed.

Send for a sample of Monsanto's newly developed Santolene C. See how it stops rust when added to petroleum products. Figure how much Santolene C can save you in preventing damage to pipe lines or tanks! See if you don't agree that Santolene C is one of the most important petroleum additive developments in years.

Santolene C is effective when used in small amounts. That makes it economical. The cost of inhibiting rust in a 42-gallon barrel of gasoline or fuel oil is actually less than two-tenths of a cent ($0.002).

Send for your sample of Santolene C today. It will be rushed to you without cost . . . without obligating you or your company. For quick response, mail the coupon. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1745-C South Second Street, St. Louis 4, Missouri.

Santolene, Reg. U. S. Pat. Off.

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Organic Chemicals Division
1745-C South Second Street, St. Louis 4, Missouri.

Please send, without cost or obligation, sample and data on Monsanto's Santolene C.

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City ..... *Zone* ..... *State* .....

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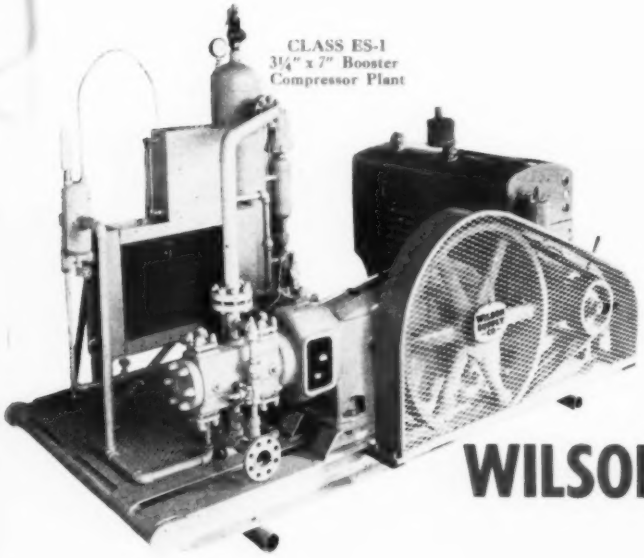
To put a "Packaged", Portable Compressor in the field capable of giving continuous, trouble-free performance—without the constant attention of a service man—is an engineering achievement.

Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors are *so* engineered—both by the manufacturer and Wilson Supply Company—that shutdown time and maintenance costs during the long life of the units are held to a minimum. And if trouble of any kind does develop—especially trained service men are available for quick action.

The Wilson Supply - Ingersoll-Rand Compressors have many automatic safety features—features that "Protect" the equipment in event of mishap when attendant is not present.

More and more the Producing & Pipe line Industries are finding these "Packaged" Compressors the answer to Gas-Oil lift, repressuring and boosters problems.

Mounted on heavy skids and completely assembled, these machines are put in operation by merely connecting the suction and discharge lines.



CLASS ES-1
3¼" x 7" Booster
Compressor Plant

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TEXAS—Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Beaumont, Kilgore, Monahans. LOUISIANA—Lake Charles, New Iberia, Houma, Harvey, Shreveport. ARKANSAS—Magnolia.

WILSON SUPPLY COM

1412 Maury St.
HOUSTON, TEXAS

the WILSON SUPPLY-INGERSOLL-RAND "Packaged" PORTABLE COMPRESSORS

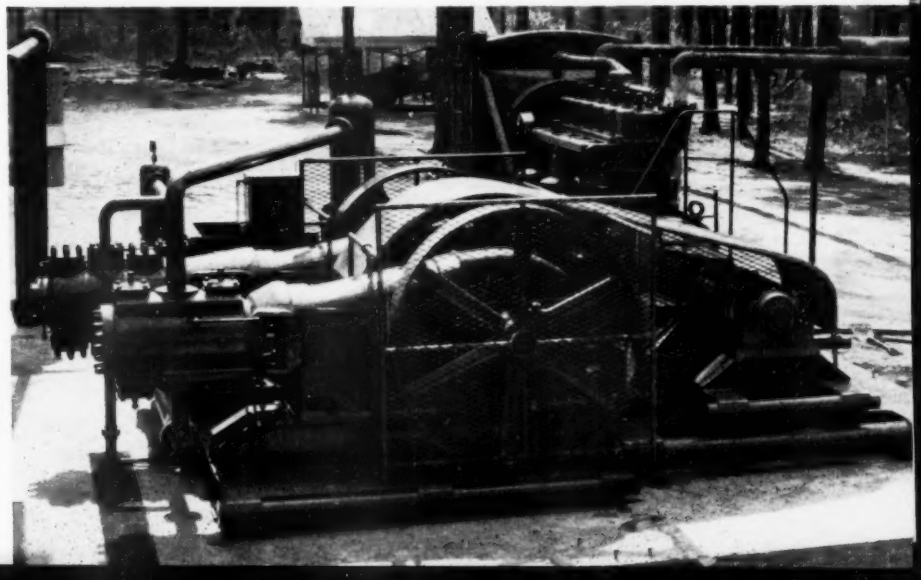
Pictured below is a Wilson Supply-Ingersoll-Rand Two-Stage "Packaged" Portable Compressor in service. This is a 10¼"x13", 5¾"x13"—240 Compressor Horse Power Machine, driven by a 375 H.P. Waukesha Engine, and is used for gas-oil lifting.

These "Packaged" Portable Machines take the place of far more costly permanent installations and can be furnished in the size to best meet your specific requirements.

What are your needs? Check the sizes and specifications of the eight standard machines listed below and see if one of these Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors cannot save you money.

1. **6"x3¼"x7"—50 H.P., 20-LB. SUCTION, 500-LB. DISCHARGE, 235,000 CU. FT. PER DAY.**
2. **8"x4¼"x9"—75 H.P., 20-LB. SUCTION, 600-LB. DISCHARGE, 402,000 CU. FT. PER DAY.**
3. **8"x4⅛"x9"—75 H.P., 20-LB. SUCTION, 700-LB. DISCHARGE, 382,000 CU. FT. PER DAY.**
4. **7"x4⅛"x9"—80 H.P., 40-LB. SUCTION, 600-LB. DISCHARGE, 547,000 CU. FT. PER DAY.**
5. **9"x4¼"x9"—80 HP., 10-LB. SUCTION, 500-LB. DISCHARGE, 405,000 CU. FT. PER DAY.**
6. **4⅛"x9"—45 H.P., 200-LB. SUCTION, 600-LB. DISCHARGE, 630,000 CU. FT. PER DAY.**
7. **3½"x11"—85 H.P., 800-LB. SUCTION, 1750-LB. DISCHARGE, 1,792,000 CU. FT. PER DAY.**
8. **5¾"x13"—117 H.P., 200-LB. SUCTION, 700-LB. DISCHARGE, 1,600,000 CU. FT. PER DAY.**

Contact your nearest Wilson Supply Company Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressures and volume to be handled.



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CHAMPION & SMITH, INC.
10 Rockefeller Plaza
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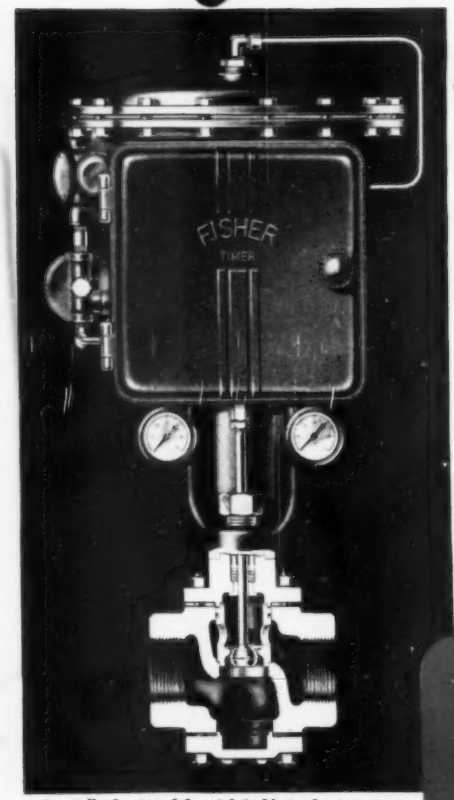
PANY

THE NEW FISHER *Intermitters*



Specially Designed for Oil Field Production Use, for Intermittent Gas Lift Operation or Intermittent Flow Control on Flowing Wells.

Features:

1. Non-bleed pilot.
2. Minimum timing period 1½ minutes with 24 hour spring wound clock.
3. Large diameter wheel with movable clips for adjusting time cycle.
4. Easy replacement of parts subject to wear. No special tools needed.

WRITE TODAY FOR BULLETIN 4500

NEW TIMING UNIT

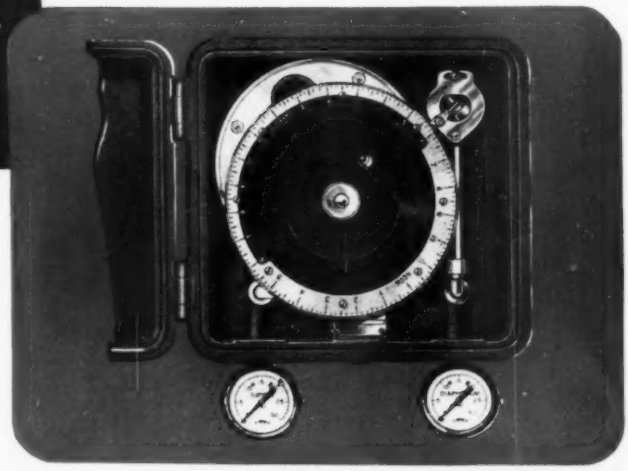
Housed in weather-proof, yoke-mounted aluminum case—has the inherent ruggedness so essential for satisfactory field operation. An economical unit.

NEWLY DESIGNED VALVE

Specially designed for intermitter production control work. 2″ screwed globe body, 1500 PSI cold working pressure.

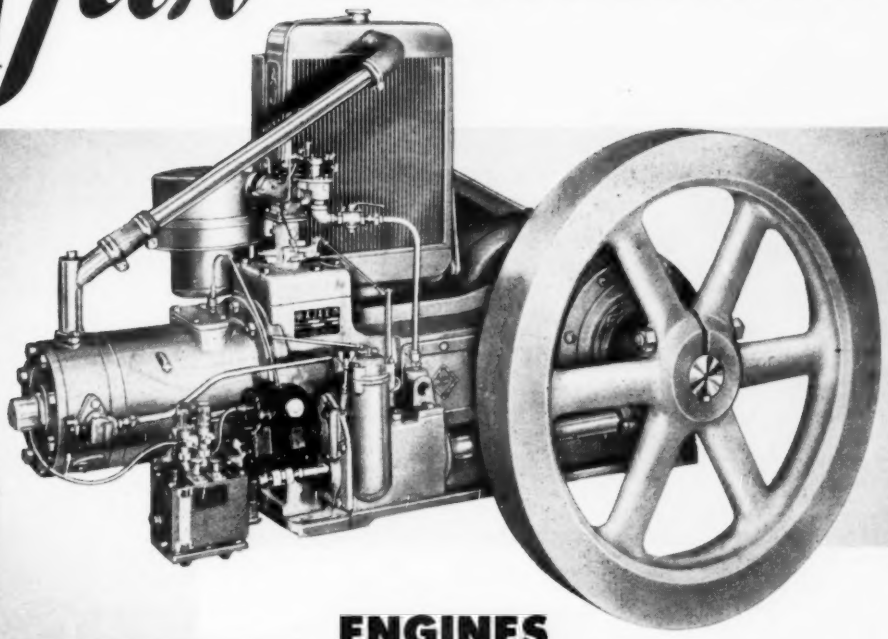
NEW ECONOMY

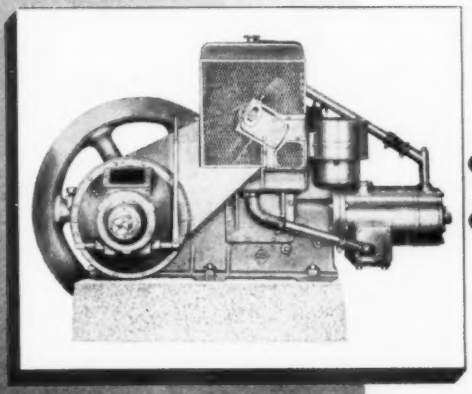
The new Fisher Intermitters are designed and built with economy in mind. They provide both lower first costs with greater operating economy.



FISHER GOVERNOR COMPANY Marshalltown, Iowa

Ajax GAS and OIL ENGINES





ENGINES NO OTHERS CAN MATCH for

- **LOW MAINTENANCE**
- **Work Horse DEPENDABILITY**

When you need low-cost, foolproof engine performance for pumping and other continuous oilfield jobs—*pick AJAX!* Get down-to-earth AJAX reliability, with maintenance so low you never notice it. These engines *stay on the job* because that's what they're built for . . . see your Supply Man and have him show you the vital reasons-why!

AJAX ENGINES

AJAX IRON WORKS
CORRY, PENNSYLVANIA

Oil Field Distributors: THE NATIONAL SUPPLY CO., TOLEDO, OHIO
R. B. MOORE SUPPLY CO., INC., BOLIVAR, N. Y. · BETHLEHEM SUPPLY CO., TULSA, OKLA.

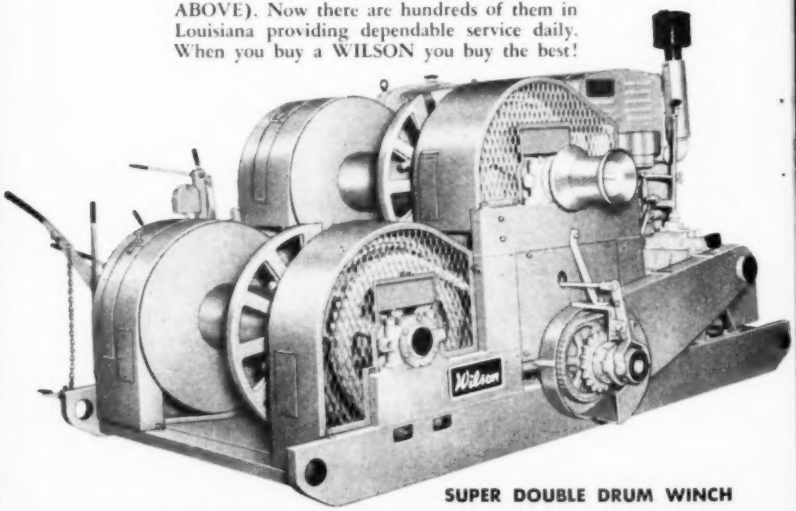
Remember The Bayou Country

Did any of you Old Timers Pioneer Louisiana?

From Pine Island to Lake Ponchartrain, roustabouts kicked alligators off the thribble board, battled mosquitoes with a rig hatchet, and rode to work in a "swamp buggy." Remember? As the Cajun said, "Nom d'un chien!"

WILSON WAS THERE! WILSON WAS FIRST!

The first power winch in Louisiana was a WILSON (SIMILAR TO ONE PICTURED ABOVE). Now there are hundreds of them in Louisiana providing dependable service daily. When you buy a WILSON you buy the best!



SUPER DOUBLE DRUM WINCH

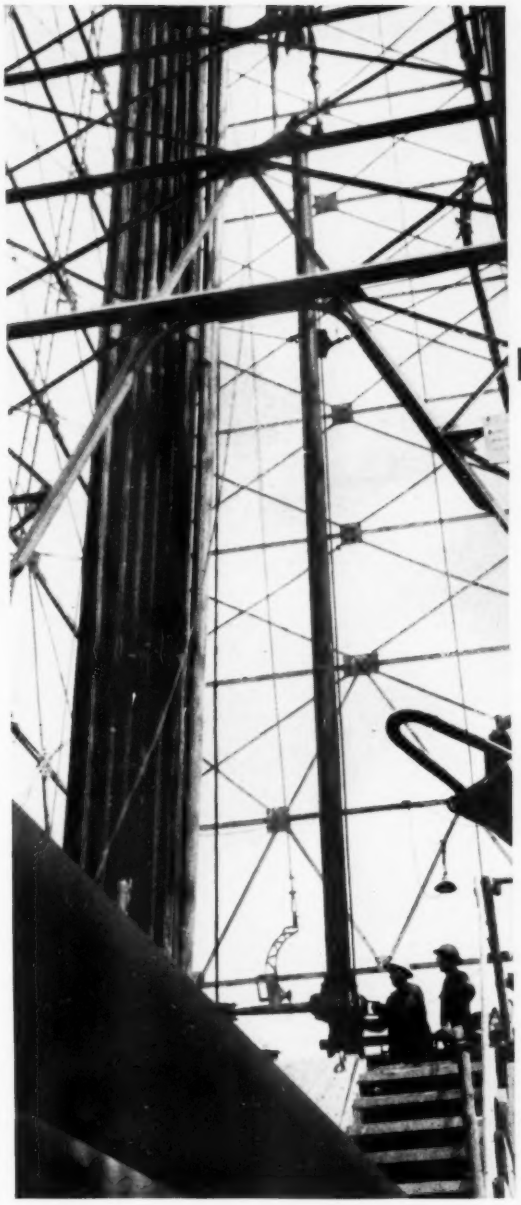
Wilson

ADVANCED ENGINEERING GIVES YOU...

- better design
- lower cost performance
- longer life
- simpler and easier operation and maintenance

COMPARE QUALITY— COMPARE PRICES— BEFORE YOU BUY!

Wilson **MANUFACTURING CO., INC.**
WICHITA FALLS, TEXAS



"We get the plug on bottom fast with REPUBLIC ELECTRIC WELD CASING.."

—says a Texas Engineer

● "When setting this casing from 4500 to 4900 feet, we have the plug on bottom in an average of four hours, forty-five minutes", said a Texas engineer as he supervised the running of 4912 feet of 5½-inch H-40 Republic Electric Weld Casing.

That's mighty fast running—*around 1,000 feet an hour* for this advanced casing that has set speed records in many a field . . . saved plenty of man-hours on plenty of jobs.

Its straight true lengths handle easily and stab quickly. Clean, full-formed threads spin-in and tong-up *fast*, and tight.

Its tubular walls are uniformly round and uniformly thick. Plenty of tough steel, left under thread roots all around the pipe, means extra strong joints that stubbornly resist pull-outs.

The high ductility steel is fully normalized and cold-sized for top resistance to collapse.

Stacking long lengths of Republic Electric Weld Casing beside your rigs is your best assurance of top running speed and safe hole protection.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, both sides of which are inspected. Thus, the surface which becomes the inside wall is free from hidden defects.

REPUBLIC *Electric Weld* **NORMALIZED CASING AND TUBING**

REPUBLIC STEEL

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes

BARRETT* PROTECTIVE PRODUCTS
COVER EVERY PIPE-COATING NEED

1 **Pipeline Enamel**
2 **Millwrap Enamel**
3 **A.A. Enamel**
4 **Asbestos Felt**
5 **Materials for Special Uses**

BARRETT* MILLWRAP ENAMEL

Like other Barrett* coal-tar enamels, Barrett* Millwrap Enamel is non-absorbent and impermeable by soil waters. Because of its stability when exposed to the surrounding electrolyte consisting of the entire soil composition, it retains its high electrical insulation value.

A permanent, strong, flexible shield protecting the pipe from corrosion, Barrett Millwrap Enamel is recommended for its ease of application and satisfactory performance. It combines the best service characteristics of the Barrett refined coal-tar pitches used in producing both regular and plasticized enamels. It does not crack at 0° F.; nor flow at 140° F.

Barrett Millwrap Enamel has demonstrated its ability to protect underground lines in extremely corrosive locations. It is also outstanding in its ability to withstand stockpile exposures before the pipe is laid, as well as exposure normal to pre-coated pipe protected at coating plants, yards, or railhead locations.

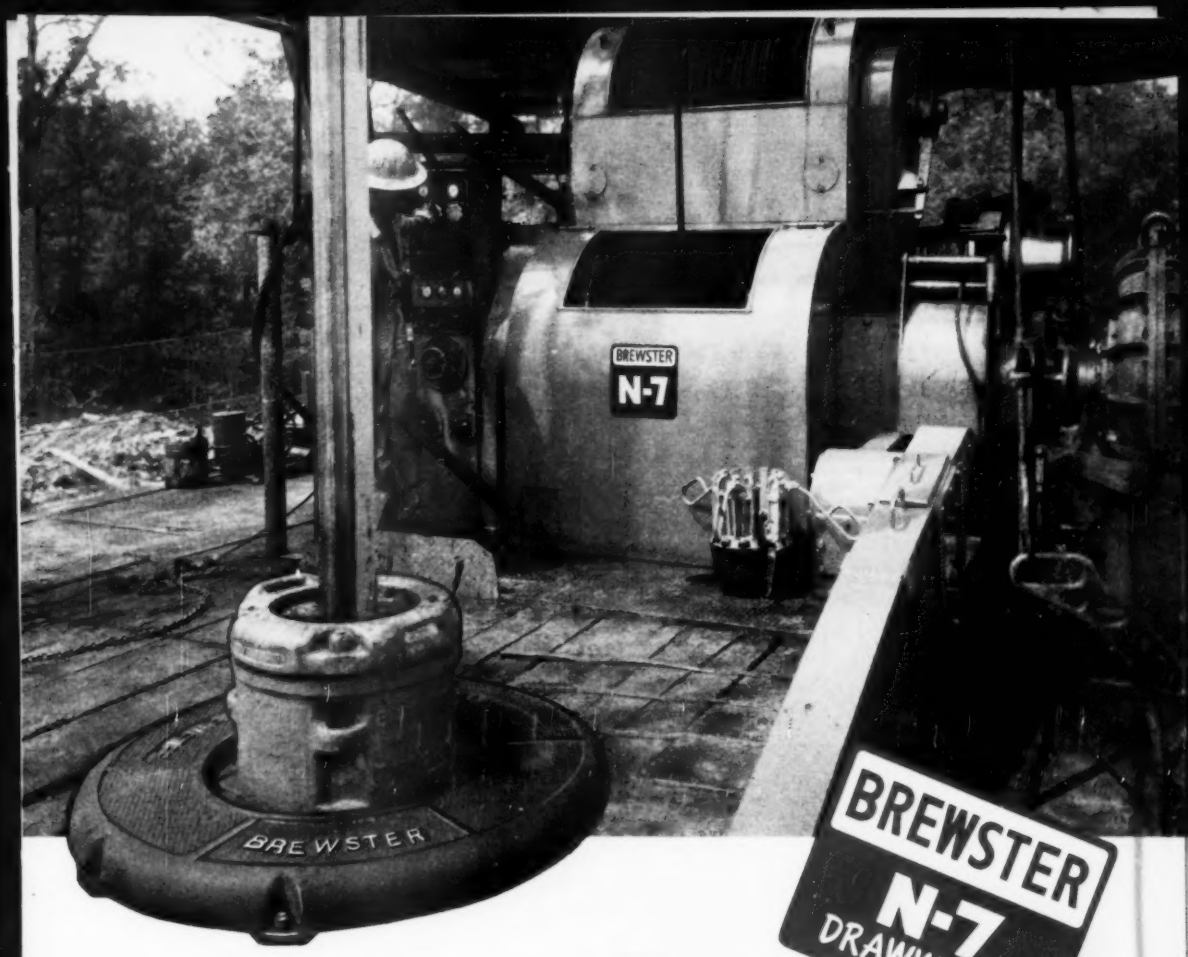
Memo: **FOR CORROSION ENGINEERS**

Barrett coal-tar materials for special uses are all dependable, durable and economical. Eternium* Paint for exposed metal work. CA-50 Heavy Duty Cold Application Coating for concrete and metal exposed to extremely corrosive conditions. Marine Enamel for ships, barges and off-shore service vessels. Service Cement and Pipeline Fabric for field joints — no torching required. Asbestos Pipeline Felt for soil stress shield Tank Bottom Compound for sour crude storage. 34 YB Paint for exposure to salt water spray conditions.

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

*Reg. U. S. Pat. Off.

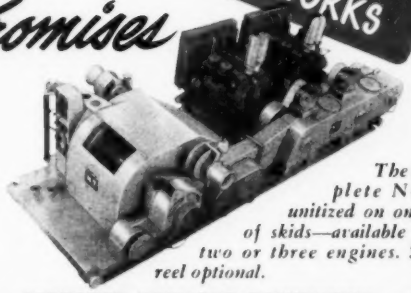


BREWSTER
N-7
DRAWWORKS

PROOF - not Promises
— Mr. Contractor!

We can show you carefully kept operating cost records of N-7 Rigs — positive proof that it's a faster, cheaper, more profitable hole when drilled with the Brewster N-7. Don't take our word for it. Make us prove it — to your satisfaction.

The N-7 has everything! POWER — more than enough for 8500' drilling. PORTABILITY — ON and OFF location in one load. ECONOMY — reasonable initial cost PLUS the benefit of



The complete N-7 is unitized on one set of skids—available with two or three engines. Sand reel optional.

MATCHED DRILLING EQUIPMENT and 24-HOUR FIELD SERVICE.

Call your nearest Brewster Representative before you start the next drilling program.

BREWSTER
MATCHED
Drilling Equipment

THE BREWSTER COMPANY, INC.

Manufacturers of Drilling Equipment Since 1919

SHREVEPORT, LOUISIANA

Brewster Drilling Equipment is Sold by:

APEX EQUIPMENT CO.
BOYARD SUPPLY CO.
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MURRAY BROOKS, INC.
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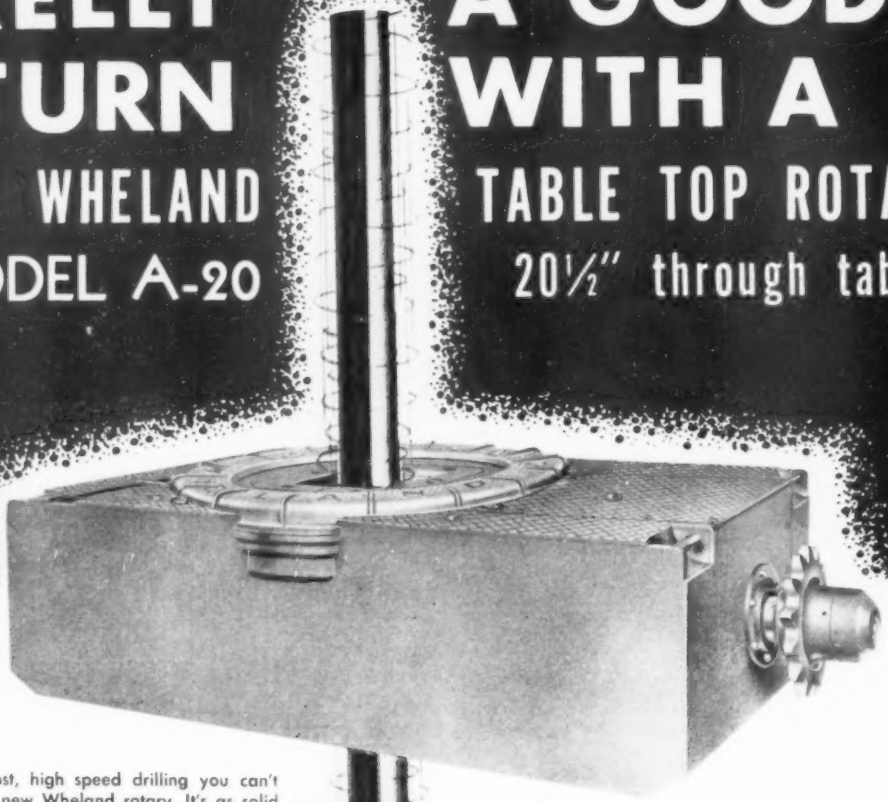
NOW GIVE YOUR KELLY A GOOD TURN WITH A *New* WHELAND TABLE TOP ROTARY

MODEL A-20

20½" through table



For low cost, high speed drilling you can't match this new Wheland rotary. It's as solid as it looks.

Fits snugly into derrick floor. Steel guard around revolving table raised 1¾".

The table rotates on bearings made to take both radial and thrust loads. Bronze table bushing alemite lubricated.

Gleason spiral gear and pinion. Pinion shaft assembly removable as a unit. Shaft is Timken mounted. Ingenious pinion shaft seals exclude sand and grit.

Triple oil compartments sealed securely. Oil levels easily checked from the top.

Table-top lock; simple, positive convenient. Engages ring gear; eliminates shock.

Split master bushing. Takes A.P.I. standard drive bushings. Master bushing, or both master and drive bushings, can be locked to table.

You will want to discuss this new Wheland Rotary. Your nearby Jones & Laughlin Supply store has all the interesting details.

Jones & Laughlin Supply Company Export Office: 230 Park Avenue, New York, N. Y., E. U. A. Wheland Export: Lucey Export Corporation, 233 Broadway, New York, N. Y., U. S. A., and Broad Street House, E. C. 2, London, England.

JONES & LAUGHLIN SUPPLY COMPANY

"...here's MY warehouse!"

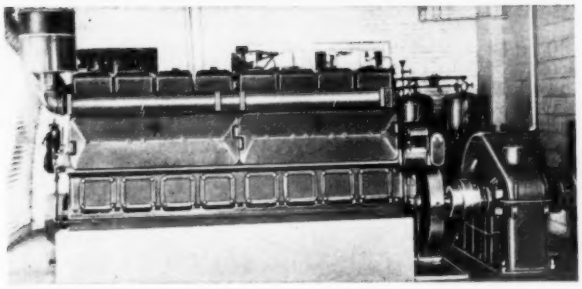
Subsidiary of Jones & Laughlin Steel Corporation

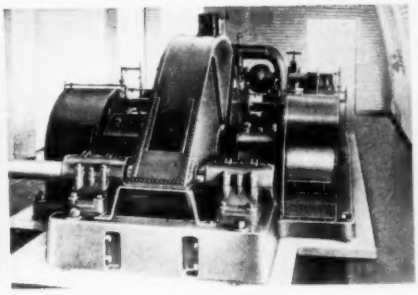
General Office

TULSA, OKLAHOMA

J&L STEEL

to help keep Canada warm





Eastern Canada faced a serious fuel oil shortage. Crude oil from tankers arriving at Portland, Maine, is piped to Montreal by the Portland-Montreal Pipe Line Company, and the company's Canadian customers asked it to increase the capacity of the line.

To meet the emergency Chicago Pneumatic built and delivered to the Portland-Montreal Pipe Line, *in half the normal delivery time*, two 400 HP 720 RPM Diesel engines operating on crude oil. As a further aid Chicago Pneumatic released, from its own production, four urgently needed electric motors to the Pipe Line System. So Eastern Canada is assured an ample supply of crude oil.

This is a typical example of Chicago Pneumatic's policy of cooperating with customers to meet emergency situations.

Write for detailed information on Chicago Pneumatic's wide line of Diesel engines.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

BUY BOVAIRD'S LINE

of Nationally Famous Products

SUPPLY BOVAIRD COMPANY

BOVAIRD Stores maintain complete stocks of the finest supplies for your field operations.

BOVAIRD Stores are strategically located throughout Illinois, Kansas, Oklahoma and Texas to give you efficient, dependable service when you need it.

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THE Bovaird SUPPLY CO.

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VESSEL DIVISION

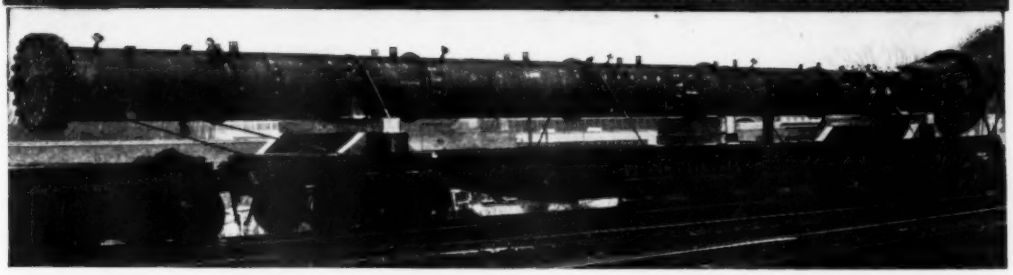
NEWS

A.O. Smith World 76th ANNIVERSARY 1874 - 1950

A.O.Smith

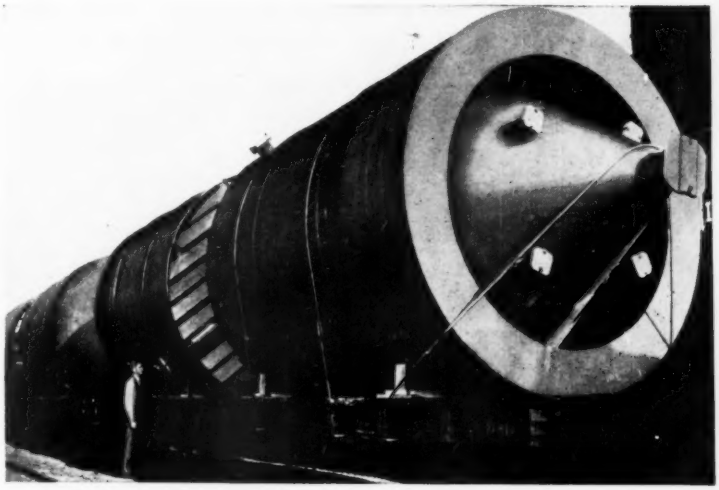
CORPORATION

New York 17 • Boston 16 • Philadelphia 3 • Pittsburgh 19 • Chicago 4
Washington 6, D. C. • Atlanta 3 • Tulsa 3 • Dallas 1 • Houston 2
Seattle 1 • Los Angeles 14 • International Division: Milwaukee 1

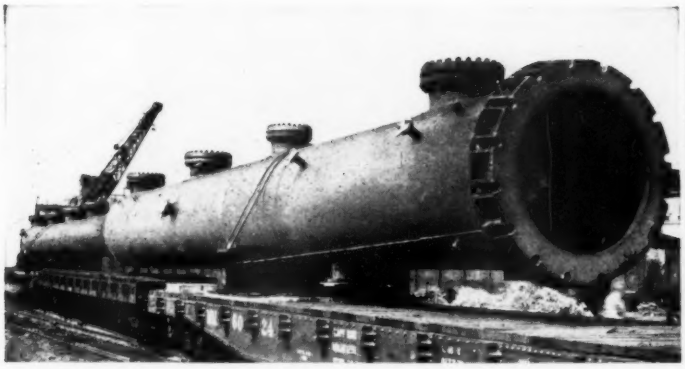


INTO EVERY SMITHlined FAT-SPLITTING TOWER, like the above 68-ft.-long SMITHway Tower, goes the experience and knowledge gained from a long and extensive program of research and development into the corrosion problems of the Fatty Acid Industry.

THREADING A NEEDLE. Getting a 12 ft. dia. by 43 ft. long paper mill replacement digester into an existing building is a difficult feat. A. O. Smith did it by shipping the SMITHlined Digesters *in sections* for final assembly and welding in place inside the paper mill.



A. O. SMITH MAKES ALL TYPES OF OIL-REFINING PRESSURE VESSELS. Here is one type, a SMITHlined Absorber Tower three railroad cars long (approximately 107 ft. long), leaving for a refinery in Ohio.



A. O. Smith Corporation, Dept. OG-350
Milwaukee 1, Wisconsin

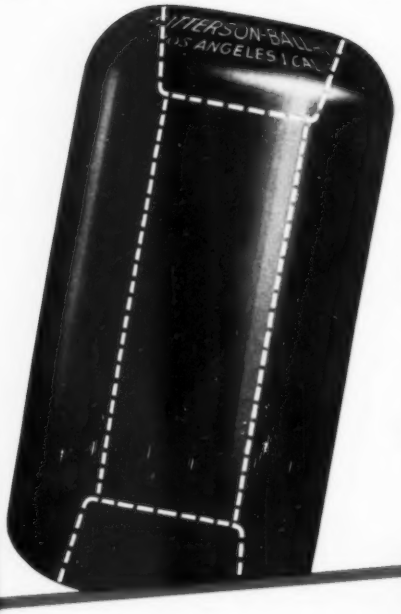
Without obligation, send us the latest A. O. Smith Vessel Bulletins:

- ☐ V-46: Alloy, Alloy-lined, Clad and Glass-lined Vessels
- ☐ V-44: Field Assembly of Pressure Vessels
- ☐ V-52: Multi-Layer Manufacture and Assembly

Name .....
Firm .....
Street .....
City ..... State .....

PB Relieved End CASING PROTECTORS

... give extra shock and tear resistance where it's needed most!



1. RUGGED! PB's *relieved end* design puts extra grip in the center—takes the stress off the ends—*gives extra shock and tear resistance where it's needed most.* PB's field proven rubber holds up under the toughest drilling conditions—withstands deepest drilling temperatures!

2. SPEEDS UP DRILLING. Field records show that PB Protectors cut friction, torque and power waste . . . allow higher drilling speeds . . . permit more accurate control of weight on the bit.

3. FULL PROTECTION for your drill pipe and casing. *Sure grip* PB Protectors stay as installed—will not slip.

Write today for 1950 catalog.

PB casing protectors installed from transfer sleeve to drill pipe in less than 4 seconds!

Our man can install PB Protectors while you make up or run pipe. No down-time while adding protectors—big savings for the rig operator!

Call your local PB representative today for a demonstration of this faster hydraulic installation equipment—available only with PB.

PB

Patterson-Ballagh

Division of Byron Jackson Co.

MAIN OFFICE: 1900 East 65th Street
Los Angeles 1, California

BJ NEW Type B Power Slip

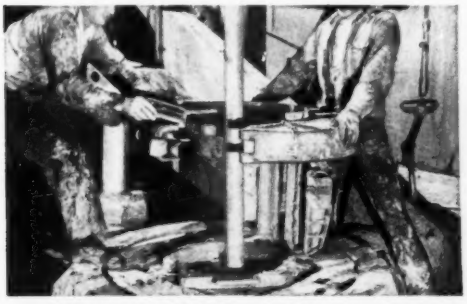
TAKE A LOOK at this new BJ Type B Power Slip—see for yourself what *new* engineering, *new* design advancements, *new* field testing and proving can do for economical power slip operation on your rig.

Note the single cylinder for pressure raising and *pressure setting* of slips . . . the offset arm construction for increased work room . . . *unitized* slips which can be quickly changed for different pipe sizes by simply removing two bolts.

The Type B sets and releases at the touch of the driller's foot, gives pressure-centering of pipe. Slip ring rotates with a free floating action when making up and breaking out with the rotary table.

In set position, slip ring body clears rotary table by several inches—an important safety feature. Capacity of the New Type B Power Slip is more than enough for today's deepest wells and heaviest strings.

The new Type B Power Slip handles 2⅞" to 7" drill pipe by simply changing slips. Compact sub-base design permits unitizing the power slip with any rotary table and *installation is made without changing your rig substructures.* Write for new Bulletin giving full details—find out how you can handle your pipe strings easier, faster and safer with the New BJ Power Slip. *Or see your BJ representative—today.*



SIDE OPENING FEATURE of the BJ Type B Power Slip enables the crew to swing the Slip into operating position around the pipe in a matter of seconds by simply removing a single pin and opening the arm gate. When the gate is closed and the pin re-inserted the slip is ready to operate.

BJ *MEANS ENGINEERED OIL TOOLS*

Byron Jackson Co.

Main Office & Plant: Los Angeles 54, Calif.
Mid-Continent Office & Plant, Houston 1, Tex.
Export Office, New York 17, New York

They Say—

From Behind the Curtain

Sir:

I would appreciate very much if you were able to send me the complete editorial index. . . .

I take this occasion to thank you very warmly the brilliant work you are doing in compiling the weekly quota of articles, these being an invaluable assistance to me. Also, I send my appreciation for the prompt and expedient dispatches of the Journal.

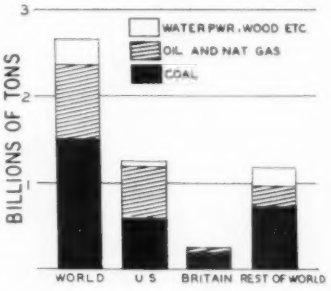
Andrew E. Sik,
Baross Gabor telep,
Hungary.

Reader Sik, who rates as one of our most persevering subscribers, required 5½ months, many letters, and much maneuvering, aided by the circulation department, to renew his last subscription, due to lack of dollars and other iron-curtain difficulties. Payment of the $3 finally was made through a woman in Michigan. The index is en route.—Editor.

Fuels Competition

"There is really not much competition between the different forms of energy because each type is best used in a particular sphere; water power is converted into electricity and supplements, rather than competes with, coal-fired power stations; coal is primarily used for heating and for large power units; oil, on the other hand, is the best fuel for small individual power units and for mobile equipment. There is, of course, some overlapping. . . .

World Energy Consumption, 1948 (Expressed as tons of hard coal equivalent).



"But competition between sources of energy is likely to be temporary. Judged by standards in the U. S. A. and Britain there is a huge potential demand for energy in the rest of the world. When the pressure of this demand is felt all fuels will be required and their orderly development and economical utilization, in their respective fields, are matters which will become increasingly important. The part played by oil in meeting the world's energy needs today is vital; it will always be so because in some spheres it is the only practical fuel."

NAFT Magazine, Anglo-Iranian Oil Co., Ltd.

Not Now, Later

Sir:

Your courteous notice that my current subscription to The Journal has expired . . . leads me to express my thanks to your entire staff. . . .

I doubt if many, or even any, of your present staff were connected with The Journal when I began reading it; and I know I have in all this time always had my money's worth. In fact, the many educational clippings I have on file . . . have to me been worth many times the subscription price. . . .

I expect to be on the move for a while. It would be useless for me to renew my subscription. . . . However, if granted the privilege, I expect to be on your subscription list again as soon as I am more settled.

Ross C. Kimball, geologist,
Sherman, Tex.

Courteous Reader Kimball, when

THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

REFINERS! PIPE LINE MEN!
DRILLING ENGINEERS!
LABORATORY TECHNICIANS!

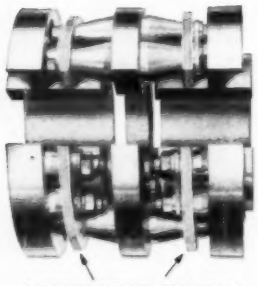
All can use Thomas Couplings to their advantage on Pumps, Compressors, Cooling Towers, Rigs or any tough job where continuous operation and dependability are required.

Specialists on Couplings for more than 30 years

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

BACKLASH
FRICTION
WEAR and
CROSS-PULL
are eliminated
Lubrication is not required!



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THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

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NO MAINTENANCE PROBLEMS.

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ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

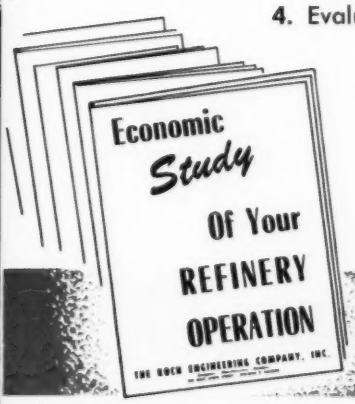
THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

WHICH WAY ARE YOU GOING?

"How can the small refiner stay in business in the face of mounting octane requirements and low prices for heavy fuel oils?"

As an independent consulting firm, we can help you answer this important question by furnishing you the following unbiased study:

1. A detailed survey of the present economic condition of your refinery.
2. Capital investments involved in the installation of new processes.
3. Results which will be achieved in improved product quality and yield, and the returns you can expect from new investments.
4. Evaluate which processes best fit your refining operation.



THIS unbiased "Economic Study of Your Refinery Operations," or a complete financial appraisal of your refinery are offered at surprisingly low costs. Write us today for further information — *no obligation.*

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he's settled, may have two subscriptions.—Editor.

Imports and Texas

"The increase in imports has been just about the amount that Texas has had to restrict her daily oil production.

"Our oil fields are allowed to produce only 15 days as these lines are written. . . . If more were produced, it could not be marketed; and to produce more than market demand is waste. . . .

"Surely there will be found some sane ground upon which we can balance imports with exports. Our very national security depends finally on domestic oil. We must not let it wither under the desert sun of foreign oil."

Ernest O. Thompson, Texas Railroad Commission, writing in Texas Parade.

Safety Is Good Business

"Safety in the plant, is, of course, obviously a humanitarian consideration. No one wants a worker to be killed or injured. But, added to this, is the fact that a safe plant is a productive plant. Safe working conditions mean more productive capacity, less costs, more profits. In short, safety in the plant is essentially good business.

"I go so far as to say that no employer in the nation today can afford to neglect safety measures. I believe that every dollar invested in the safety of workers pays good dividends, both in the reduction of death and injury as well as in more efficient operation of the plant. The two elements go together. It should be one of the greatest means of persuading every segment of management to give wholehearted support to modern safety practices."

William B. Barton, employer-employe relations director, U. S. Chamber of Commerce, addressing Governors' Conference on Industrial Safety. St. Paul, Minn.

Water-Flood Success

"In Greenwood County, Kansas, Ohio is operating five floods in several stages of development. These projects range from those which are just beginning to increase production, to those floods which have almost depleted their waterflood recoverable oil. Since Ohio started its first flood in this area in 1944, development has been rather constant. By the end of 1949 our company was operating about 600 acres under waterflood. Approximately 13 million barrels of water has been injected and 1.8 million barrels of oil recovered from this acreage under water flooding in Greenwood County.

"Water flooding has increased the production per well per day from 1 to 2 bbl. to as high as 200 to 300 bbl. In most cases production rates for the entire field are as high or higher than the highest production rate of the field during primary stages of production. Also, the total oil produced during water flooding in those Greenwood projects now approaching secondary depletion equals or exceeds the oil produced during the primary stage."

Floyd E. Suder, Jr., Ohio Oil Co. engineer, writing in the Beacon.

No Federal Help Wanted

"The Independent Refiners Association of America opposes any investigation of the oil industry based on the present plight of the independent refiner unless that investigation is initiated within the industry; and the I.R.A.A. feels that if assistance is needed, it should not come from a federal level.

"While it is possible that the independent refiner, like any individual, could benefit from the removal of certain conditions tending to restrain trade, it is also possible that an investigation improperly initiated could contribute to the unfavorable conditions surrounding the independent refiner as well as have an adverse effect on other individuals and segments of the petroleum industry."

Harry Leyendecker, I.R.A.A. president, following resolution of Representative Cannon calling for F.T.C. investigation of oil industry.

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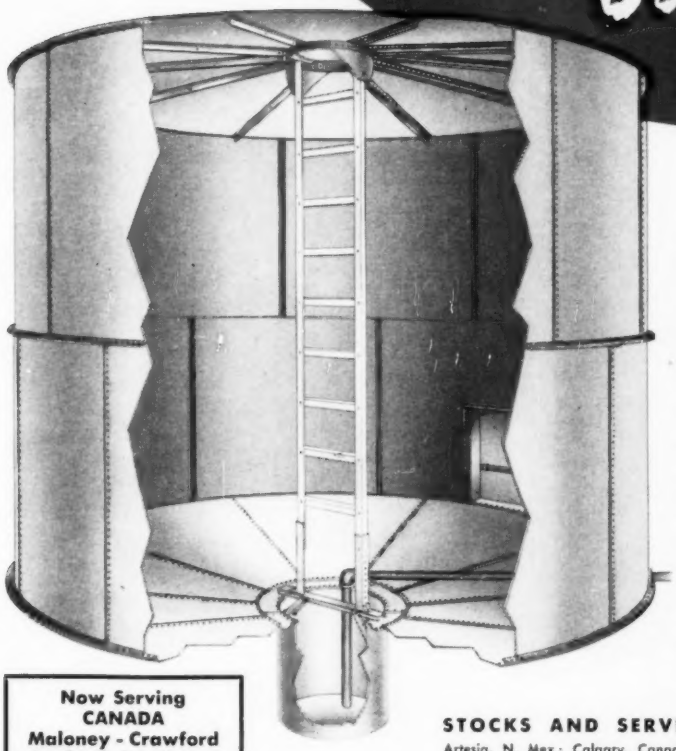

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Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Okla. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

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JOURNALLY Speaking

Oil Bug

A LETTER with a southern postmark asks:

"I want to know if you-all have an oil and gas finder—some call them an oil bug—something to locate crude oil down in the ground. And if so, how much will one cost me? I want one that a man can carry in his hand while locating oil, see? Also, how much does The Oil and Gas Journal cost for a year?

The answer to the last question is easy: Three bucks. The answer to the first question is also easy: No, we don't have an oil bug. How much an oil bug will cost is a difficult question, because it hasn't been put on the market yet.

But this might be a good time to comment on this publication's policy on doodlebugs in general. In a nutshell, that policy is the good old Missouri slogan: We've got to be shown. We don't deny that there ever can be a gadget that one man can carry to locate oil and gas under the ground; we just say that to date all reports of such have been grossly exaggerated.

Our editors are frequently importuned to publicize the claims of some new doodlebug, and they have a standard answer: Present a detailed description in a paper delivered before a meeting of a reputable society of geologists or other scientists, and we will print a report on your paper.

Of course, every now and then there is an invention which is reported in the lay press in a way which would lead the uninitiated to conclude that a successful doodlebug has at last been discovered. On examination these usually prove to be merely improved tools for the geophysicists' kit—and that's all the inventors claim for them. They won't locate oil and gas as such from the surface of the ground, but simply give a little more help in making educated guesses as to likely spots to look for oil.

Even here we are a bit skeptical. If the developer has a scientific background, has done some impressive research work, and makes reasonably modest claims, we will print his claims for their face value. But quite often we turn the whole thing down and print not a word.

Our doodlebug policy is something like that of the U. S. Patent Office toward perpetual-motion machines. It doesn't say such a thing can't be invented. It simply requires submission of a working model. So far no patent has been issued for a perpetual-motion machine.

And so far we have not seen a working model of an oil finder such as our southern friend wants.

High Octane

THE U. S. Air Force has greatly improved its ability to refuel planes in flight by a new telescopic tube which can be poked into the filling spout by an attendant on a "flying tank car." Military secrecy withholds details, such as whether it can also wipe the windshield and check the oil, but this development brings nearer the comic-book concept of aerial filling stations. Next step is to adapt the idea to highway use for the benefit of tourists who can't take time to stop at a filling station. Ought to be a good tip for marketers on some of these superspeed toll highways.

Oil for War

ACCORDING to a petroleum information clip-sheet, distributed to newspapers as "filler" material, during World War II the Pacific Ocean area required 22 billion barrels of petroleum products monthly. At that time, military petroleum requirements were a well-censored secret. If this postbellum disclosure is correct it is no wonder civilians were short of oil, because total refinery production in this country was only about 2 billion barrels per year. Wonder where the Navy got the rest of it. But maybe 22 billion a month is what the military procurement officers said they needed. As we recall the demands the military made on the oil industry, that figure sounds about right.

—Henry D. Ralph

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VOL. 48. NO. 47 MARCH 30, 1950

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Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1950 by The Petroleum Publishing Co.

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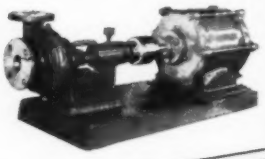

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Confusing Issues

Regardless of what eventually befalls legislation in Congress pertaining to natural-gas regulations, we now have an object lesson of what can happen in a matter involving conservation and operating procedure.

Government opponents of the plan to limit the powers of the Federal Power Commission to those provided by the Natural Gas Act of 1938 have been successful in evading the issues pertaining to public policy and in creating other issues which don't exist.

The tenor of some of the current comments in the press and on the air would lead to the conclusion that the petroleum and natural-gas industry is engaged in a plot greatly to increase income from natural-gas properties through vicious legislation with millions of consumers paying the cost.

The initial issue was raised when FPC extended its controls to the production and gathering of natural gas as an integral part of its unquestioned authority to regulate interstate shipment and was supported by a Supreme Court decision.

This was correctly interpreted to mean that FPC has authority to extend price control to the well head, a basic principle at complete variance with government-business relations during peacetime.

Never was there a better example of how the powers of Government can be extended by simply having an agency assume them. This is a device well known to those who have no sympathy with our established principles of Government. Apprehensive members of Congress have pointed out that this is one of the sure and quick roads to a socialized or welfare state.

As to price, the past and present should be convincing. The latest government wholesale index shows natural gas, 88.3; petroleum, 108.5; bituminous coal, 192.4. Incidentally, the wholesale commodity index for the same month was 151.6.

This is not the record of an industry which seeks to overcharge its customers. On the contrary, through the years those responsible for natural-gas policy have endeavored to expand their business on the basis of service and economy.

It is true that field prices for natural gas have been advanced in recent years. This marked the end of a period in which natural gas remote from adequate markets was either flared or disposed of largely at prices which had no relationship to the intrinsic value of gas as fuel.

To end the waste and to justify the installation of conservation operations, higher prices were necessary. To find markets 500 to more than 2,000 miles from the source, hundreds of millions of dollars of new capital have been expended.

Competition in the production of gas has not been impaired. Keeping production free from the regulations which should be confined to interstate transmission will promote this competition, not deaden it.

THIS WEEK

COMPETITION—A real fight for fuels markets is shaping up. . . . Fuel oil gained 150,000 bbl. per day at the expense of coal last winter, but will lose half of this gain. . . . Inroads of natural gas will keep fuel oil from expanding its markets during next 3 years, and in some regions the market will contract. . . . Refiners must make further shifts in yields to reduce fuel-oil output. . . .

TECHNOLOGY—New vistas constantly challenge the oil industry as research and technology race onward. . . . ¶This week many developments were reported. . . . ¶Synthetic lubes may take a small but important part of the market. . . . ¶New developments in water flooding can bring big increase in secondary recovery of crude. . . . ¶Petroleum is becoming a major supplier of chemicals for the plastics, agricultural chemicals, and other industries. . . . ¶Successful tests with first Platforming installations promise refiners new opportunities to upgrade straight-run gasolines and naphthas. . . .

PRODUCTION—State allowables trend upward in wake of Texas' big jump in April rates. . . . Louisiana, Kansas, Oklahoma follow suit. . . . ¶Texas was forced to modify its drastic formula applied in March because of pressure from regions facing economic hardship from severe cuts in production. . . . Modifications give greater weight to new discoveries, deep production. . . .

PIPE LINES—Steam-driven centrifugal compressors, first in the industry, will be tried on new Transcontinental gas line. . . . Comprehensive microwave communications system also considered. . . .

TRENDS—Since the last week in November over 500,000 bbl. daily of total demand for major petroleum products has been supplied from accumulated stocks. . . . If new supplies continue at the winter level, demand in the second quarter can drop half a million barrels daily without additions to inventories. . . . ¶Stock reductions for the past 3 weeks have been at a higher rate than the peaks reached in the winter of 1947-1948. . . .

ACTIVITY—Crude-oil production for week ended March 25 averaged 4,776,665 bbl. daily, an increase of only 115 bbl. daily over previous week. . . . A total of 721 wells were completed compared with 646 in the same week last year. . . . Wildcat completions were off 19 wells from previous week to 126. . . . Rotary rigs operating in United States on March 20 decreased 36 rigs to 1,931.

INTERNATIONAL—Navy will drill seven wildcats in its Alaska reserve this year. . . . Last year's tests found no oil but encouraged further attempts. . . . ¶Socony-Vacuum's British operation will merge with English firm and build big new refinery near London in attempt to retain foothold in United Kingdom. . . . ¶Mexico's big Salamanca refinery will be in full operation in 3 months.

OFFSHORE—Supreme Court hears arguments in Government's suit to capture Texas-Louisiana offshore oil lands. . . . ¶But despite unsettled ownership, offshore development continues active. . . . While tenth Louisiana offshore field is opened, three more look imminent and other wildcats are drilling. . . .

FOREIGN OIL—A big importer, Socony-Vacuum, publicly defends imports, claiming domestic industry is not injured. . . . ¶But the outcry against imports becomes louder at every gathering of domestic oil men. . . . ¶Suggestion that Canadian crude be exempted from any restrictions on imports raises a new political problem. . . . ¶State Department's tentative draft of protest to Britain over ban on dollar oil is unsatisfactory to U. S. companies. . . .

ALONG THE GULF.—Exploratory work along the Gulf of Mexico continues despite threats of foreign oil and reductions in allowables. Last year 175 wildcats in South Louisiana made 70 discoveries, or 40 per cent successful; on the Texas Gulf Coast 1,176 wildcats made 263 discoveries, or 22.4 per cent successful. The national average of wildcat successes was only 17.6 per cent. This picture shows a Cities Service seismograph party in a South Louisiana swamp.

Water-Flood Discussion

North Texas oil men study problems of secondary recovery in area; need for planning, adequate core data is cited

Roy F. Carlson

WICHITA FALLS. — The day of haphazard unplanned water flooding for secondary-recovery purposes should be past, according to engineers speaking at the annual meeting of the North Texas Oil and Gas Association here.

The necessity for a thorough, intensive, and complete engineering approach to the problem of water flooding was repeatedly pointed out by the speakers. With large numbers of wells in or approaching the marginal stage, and the growing necessity for recovering a maximum of oil with a minimum of expense, techniques and methods must be applied that will lead to the best type of recovery program.

The North Texas area is the most-intensively water flooded in the state of Texas, and the problems of water flooding constituted nearly all of the meeting.

Engineering approach.—Proper planning is an absolute must to a successful secondary recovery program, said Donald T. May and Thomas C. Canan, of Ryder-Scott Co., Wichita Falls. Although haphazard programs of water flooding have in the past occasionally helped improve recovery, a reservoir can be badly hurt by institution of an improper program, they said.

According to the authors, the five-spot flood is presently the most satisfactory general flood pattern, although the ideal arrangement from a spacing and pattern standpoint should be determined by the characteristics of the reservoir.

May and Canan used in illustration a lease in Bradford, Pa., that has undergone an unplanned flood, and a part of which was later subjected to an engineered five-spot flood, as shown in the accompanying drawings. In this lease, water was injected under hydrostatic head only. The first input wells were dumped; the surface casing of old oil wells or dry holes was removed, and surface water allowed to flow into the pay zone. Between 1917 and 1938 some input wells were drilled, primarily along property lines.

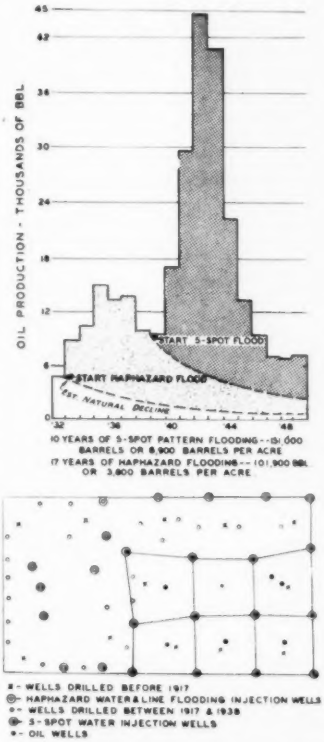
The 17 years of flooding from 1932 to 1950 produced about 101,900 bbl. of oil or 3,800 bbl. per acre for the 27 acres affected by the haphazard flood.

On the other hand, the five-spot flood affects about 22 acres of the property, and in 10 years of operation produced 251,600 bbl. of oil or 6,900 bbl. per acre.

Case histories. — Additional emphasis was placed upon the necessity for sound and thorough engineering of a water-flooding project by Verdun Leonard, of Magnolia Petroleum Co., and Rollie P. Dobyns, of the Bureau of Mines. These men outlined a report prepared by them with the secondary-recovery committee of the North Texas association. "The best and safest way to insure a profitable water flood is to employ the most modern engineering techniques in analyzing the reservoir before water flooding is begun," they said.

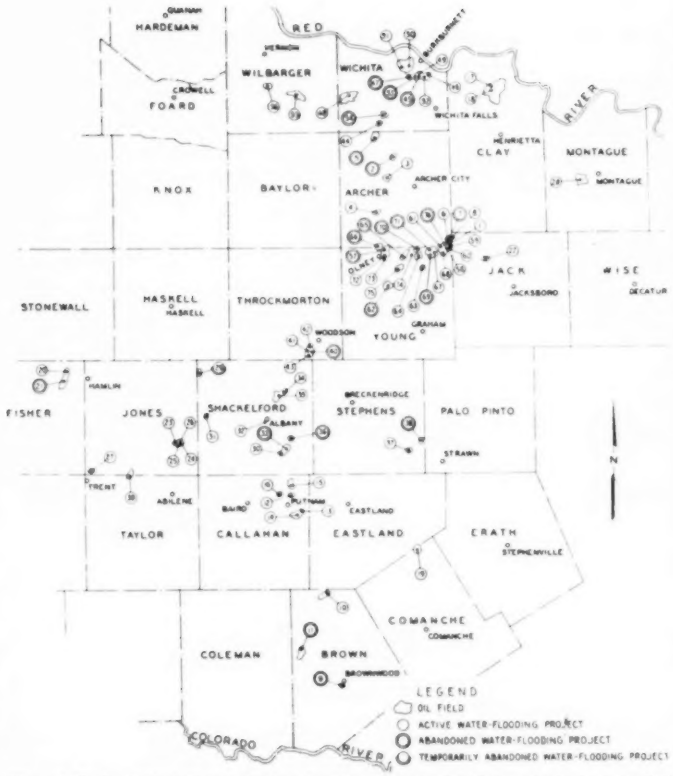
The authors concluded that in any water flood an operator should recognize that a large amount of time may be necessary for a reservoir to respond to flooding. They deplored the lack of core data, saying that without it a water flood cannot be properly operated. The limits of the reservoir must be thoroughly established, and the reservoir mechanics fully established before a flood is started, the authors said, to prevent loss of oil through migration.

They further emphasized that each flooding project must be considered separately, and comparison of a planned project with successful flooding of a similar reservoir should be limited. Wide spacing, they said, in reviewing one flood example, will be as successful in recovering oil as will closer spacing, although the time required for recovery of equal amounts of oil will be greater. The example



This map and chart show the difference between haphazard water flooding and carefully engineered five-spotting. Both types were done on the Bradford, Pa., property shown. Formation characteristics for the lease were: Net floodable sand thickness, 36 ft.; average permeability, 6 md. (maximum, 50 md.); porosity, 13.6 per cent; average oil saturation, 50 per cent; total oil content, before flooding, 19,000 bbl. per acre.

Banquet scene at the North Texas Oil and Gas Association meeting. At extreme left is J. Ed Warren. Others are, from the left, C. P. McGaha, Clay Underwood, association president, Bruce K. Brown, and J. S. Bridwell. Brown is president of Pan Am Southern Corp. The others are independent producers.



Map of North Central Texas showing location of water-flooding projects in July 1949. Operators of the floods, by counties, are: ARCHER—1, Cable Oil Co.; 2, Peterson & McCarty; 3, Producers Development Co.; 4, Reno-Continental Oil Co.; 5, Shell Oil Co.; 6, S. & S. Oil Co.; 7-8, White & Duncan. BROWN—9, Hightower Oil & Refining Co.; 10, J. D. Sandefer; 11, The Texas Co. CALLAHAN—12, Chapman Oil Co. of Texas—Dean Brothers; 13-14, Dean Brothers; 15, Tex Harvey Oil Co.; 16, Trumier Petroleum Co. CLAY—17-18, Ward Williams Oil Co. COMANCHE—19, Coast Oil Corp. FISHER—20, M. E. Daniel; 21, General Crude Oil Co. JACK—22, Martin & Kurtz. JONES—23, Fain & McGaha Oil Corp.; 24, Manley Brothers; 25, Roark & Hooker; 26, Jack B. Robert; 27, Street Investment Co. MONTAGUE—28, Continental Oil Co. SHACKLEFORD—29, Baker & Camp; 30, Dean Brothers; 31, Martin Properties; 32, G. M. Neff; 33, Roark & Hooker; 34, Roeser & Pendleton; 35-36, Street Investment Co. STEPHENS—37, Dean Brothers; 38, Texas Pacific Coal & Oil Co. TAYLOR—39, West Central Drilling Co. THROCKMORTON—40, Dean Brothers; 43, Jack B. Robert. WICHITA—44, Arkansas Fuel Oil Co.; 45, Bell Oil & Gas Co.; 46, Cable Oil Co.; 47, Hightower Oil & Refining Co.; 48, Kemrow Co.; 49-51, Magnolia Petroleum Co.; 52, Pan Oil Co.; 53, Peterson & McCarty; 54, F. L. Pilkenton. WILBARGER—55, Cities Service Oil Co.; 56, Humble Oil & Refining Co. YOUNG—57, Bridwell Oil Co.; 58-60, Cable Oil Co.; 61, Fresno Oil Co.; 62, H-Y Oil Co.; 63, Charles J. Kleiner; 64, Pemeta Oil Co.; 65-66, Reno Oil Co.; 67-71, Street Investment Co.; 72, Tide Water Associated Oil Co.; 73, Trumier Petroleum Co.; 74, West & Honea; 75, White & Duncan; 76, Worth Oil Co.

used had adjoining leases using five-spot and inverted nine-spot flooding patterns.

That extreme care must be used in selecting a water for a flood was pointed out by R. C. Earlougher, Tulsa. Improper selection of water and a water source can have drastic results in an attempted flood. Suspended solids and algae may plug the sand face, and other solids may cause difficulty in surface equipment. Mixing of water with different composition without previous analysis and study was warned against.

The best flooding water in this author's opinion is a subsurface brine. These waters, he said, give a greater rate of input in a flood with a lower input pressure than do fresh surface waters.

Coring. — "The information required to develop a field properly should be obtained while wells are being drilled," said Ray Staples, of Cable & Stine, Wichita Falls, in telling of the relationship of coring to secondary recovery. "Well completions should be made with pressure maintenance or repressuring in view, because the recoverable reserves are increased substantially in reservoirs which are susceptible to either method."

"It must be kept in mind," he continued, "that full core recovery and complete analyses are absolutely necessary for a thorough knowledge of the reservoir." The completeness is necessary and would include such quantities as permeability, porosity, oil viscosity, oil saturation, and whether or not a gas cap, gravity drainage, or thief formations were present.

A high degree of success in coring shales, sandstones, and limestones with the Electrodrill was reported by Sergei Arutunoff, one of the tool's developers. With this electrically driven tool, cores are taken under a small fluid head and are cut by a rotating bit. This action, said the speaker, offers a very good method of recovering a "good" core—one that is a representative sample of the formation, in its entirety, and in as near its natural state as possible.

Formation fracturing.—Hydrafrac, that process by which an oil producing formation is hydraulically parted with these fractures then mechanically held open by a propping agent, has proved effective in increasing production from old wells and is becoming increasingly important in the treating of newly drilled wells.

In North-Central Texas, after 1 year of commercial application the process has increased production in 63 per cent of the wells in which it has been used. Summaries prepared by W. E. Hassebroek and Tom E. Norton, Halliburton Oil Well Cementing Co., indicated that wells may be treated through perforations as well as in open hole.

Also Hydrafrac has been successfully used in the treatment of wells that have been shot with nitroglycerin. In the 18 wells that were treated after previous shooting, 61 per cent showed an increase in recovery. Declined production, the authors say, is responsible for the difference between the 61 per cent figure and one of 84 per cent for 25 wells in the same area that were treated in open hole without shooting. The highest degree of success with Hydrafrac in North Texas has been achieved in the Strawn series of sands—usually of low permeability and good bottom-hole pressure, and producing a high-gravity oil with solution-gas drive.

Secondary reserves.—To show the importance of secondary-recovery projects in the national oil picture, Albert Sweeney, Jr., director of the secondary-recovery division of the Interstate Oil Compact Commission quoted estimates that to date, during 25 years of active operations, about 1,250,000,000 bbl. of oil have been produced from secondary-recovery projects.

He estimated that during the next 10 years about 1,000,000,000 bbl. of oil will be produced by secondary methods. He further estimated that primary reserves in stripper-well fields were in excess of 3,000,000,000 bbl. and that the probable secondary

reserves in these same fields were about 4,500,000,000 bbl.

Sweeney pointed to fields which do not now but will some day require a secondary method of recovery as being another possible large source of secondary-recovery reserves.

Crude prices.—The admittedly unorthodox view that the price of crude oil should not have gone up and should not be kept up uniformly on all grades was expressed by Bruce K. Brown, president of Pan-Am Southern Corp., New Orleans.

The postwar job of raising crude-oil prices was accomplished in a manner repugnant to the basic principles of our free-enterprise system, and some of the mistakes still need to be corrected, he said. The Office of Price Administration set a bad pattern by allowing an increase of "10 cents across the board" before it expired, he said, and when the oil industry took over its own affairs again it seemed to have been bitten by the "equal shares for all" bug.

"Crude oils generally increased $1.30 per barrel, regardless of their value in the terms of the products produced from them," Brown said. "The same increase was attached to gasoline-making crudes as to asphaltic and fuel-oil crudes.

"As long as products were in short supply there was money to be made in refining almost any crude in any equipment at any labor cost. Now that the economic tide has turned, the unsoundness of giving approximately equal raises to all types of crude has come back to haunt us.

"Crude prices have to be adjusted to the market value of the products they supply. Some steps have been taken in the case of some low-value crudes but the job of pricing crudes realistically is far from complete.

"This situation has nothing to do one way or the other with the cost of producing crude or with the average cost of all crude oils. If the law of supply and demand dictates that crude oils shall become more valuable, then I say that the poor-quality crudes should not go up in price so much as the others. If the pendulum swings the other way, then I say the poor-quality crudes should be cut in price more than some others."

Canadian imports.—Brown also took an unorthodox stand on imports, declaring that Canadian crude should be permitted to enter the United States without restriction.

He reasoned that the best argument domestic producers can use in favor of restricting imports is that national security becomes impaired to the extent that the country becomes dependent on foreign crude petroleum moving through channels that can be cut by an enemy in time of war.

Canadian crude would be an important asset in time of war because it could not be cut off by an enemy, he said, and unless domestic producers make it clear that they do not want restrictions on Canadian crude their arguments for excluding imports on the ground of national security are hollow and unreal.

Industry health.—A healthy petroleum industry exists when conditions encourage continued progress when it has the ability to sustain an exploratory effort sufficient to meet the oil needs of the nation, the association was told by J. Ed Warren of Midland, president of the Independent Petroleum Association of America.

Current factors which threaten the health of the oil industry were listed by Warren as including attempts to interfere with regulation of conservation and production by the individual states, federal regulation of natural-gas production, the attack on the statutory depletion allowance, and excessive imports of foreign oil.

The entire question of unrestricted imports should be examined objectively by gaging the amount of damage that occurs to all segments of the domestic industry and the entire question should be resolved within the oil industry, Warren said. However, he declared, unless the industry finds and adheres to a realistic and certain method for keeping imports to the volume needed to supplement domestic production, the independent producers must turn to Congress for protection.

Resolutions.—The association at the close of the meeting adopted three resolutions.

They provide that: (1) Congress be urged to maintain the present statutory depletion provision; (2) Importing companies voluntarily restrict imports to such quantities "as will only supplement and not supplant" domestic oil and, further, that the association urge members of the Texas congressional delegation to support enactment of legislation restricting imports to "reasonable" levels; and (3) the association urged enactment of the Kerr-Thomas bill amending the Natural Gas Act.

Allowable Reaction

Operators show moderate enthusiasm over output figure for April; commission sets new discovery-well schedule

Carl F. Hoot

DALLAS.—Reaction to the Texas Railroad Commission's modified allowable order for April was, in general, that it provided the necessary immediate relief for producers, royalty owners, and wage-earners, but such relief was looked upon as a temporary answer to the problem of excess producing capacity.

Independents and others not connected with importing companies blame crude-oil imports for the present crude situation in this country.

Some opinion is that the situation will take care of itself if crude imports are reduced and held at a level proportional to the supply and demand in this country, with first consideration being given to producers here.

In that connection, at the recent proration hearing in Fort Worth more light was thrown on the full results of drastic cutbacks in production than had been done at any other meeting. It was graphically shown that placing the burden on a few fields affected entire communities whose major income may be derived from oil production.

The commission's restoration of some of the cutback production in a number of fields, on the basis of a current small increase in demand, prompted some to ask: "If the situation changes and this 'kitty' is used up, will these same fields have to bear the brunt of the reduction deemed necessary to take care of the situation?"

Allocation explained.—In Austin, Chairman William J. Murray explained the allocation of the 130,376-bbl.-daily increase in April allowables, which according to early reports had all been given to 134 fields where production had been cut in March.

Murray said that retention of 17 producing days in the 30-day month of April meant a greater daily average allowable for all fields than would the same period in the 31-day month of March, and that this accounted for about 44,000 bbl. of the April increase.

The other 86,000 bbl. of the April increase was prorated to the 134 fields reduced in March, and allocation to each field was based on that particular field's most efficient rate of production, under a formula that also took into account the amount of March cut.

Among the fields thus increased were four in Scurry County which had suffered drastic reductions in March. The April allowables for these are:

North Snyder, 40,348 bbl. per day, up 14,310; Sharon Ridge Canyon, 6,149, up 1,986; Diamond M, 16,338, up 5,174; Kelley, 22,717, up 7,300.

In retaining the "1947 yardstick," the commission adopted the current 17-day pattern as the basic allowable and employed MER to distribute the

increased demand, reflected at the Fort Worth hearing.

The MER factor for April was set at 45 per cent, which had the effect of restoring 45 per cent of the March cut made in several fields, without exceeding those fields' MER's. This factor will be subject to rise and fall of market demand, it was said.

Estimated production of natural gasoline and distillate of 300,647 bbl. a day brings total liquid hydrocarbon production in Texas during April to 2,389,369 bbl. daily, an increase of 329,369 bbl. daily over the Bureau of Mines' demand forecast of 2,060,000 bbl.

The April allowable by districts, with increase over March:

District—	April	Increase
1. Southwest	28,928	328
2. Southwest	120,496	4,501
3. Gulf Coast	365,721	40,185
4. Southwest	193,540	5,506
5. East Central	28,161	4,489
6. East Texas field	259,327	7,933
6. East Texas (other)	82,691	4,790
7-B West Central	75,209	1,307
7-C West Texas	51,504	3,216
8. West Texas	608,283	55,260
9. North Texas	169,395	2,856
10. Panhandle	105,467	5
Total	2,088,722	130,376

The commission also issued a new production schedule for discovery wells, increasing the allowable for those 9,000 ft. and deeper.

The schedule:

Depth, ft.—	Allowable daily bbl.
Under 1,000	20
1,000 to 2,000	40
2,000 to 3,000	60
3,000 to 4,000	80
4,000 to 5,000	100
5,000 to 6,000	120
6,000 to 7,000	140
7,000 to 8,000	160
8,000 to 9,000	180
9,000 to 10,000	200
10,000 to 10,500	210
10,500 to 11,000	225
11,000 to 11,500	255
11,500 to 12,000	290
12,000 to 12,500	330
12,500 to 13,000	375
13,000 to 13,500	425
13,500 to 14,000	480
14,000 to 14,500	540

The next state-wide proration hearing will be held in Austin April 14. On the same date a hearing has been scheduled for operators to show cause why the Canyon-reef fields of Scurry County should not be classified as a common reservoir.

Texas' Oil-Tax Income Down

AUSTIN.— In the first 6 months of the current fiscal year, Texas' income from the severance tax on crude oil dropped $10,000,000.

Latest information from the state comptroller's office reveals that the state received $39,013,652 through February as compared with $49,459,815 for the same period last year. Texas crude production has dropped sharply over the past 15 months because of reduced market demand.

By contrast, the state's income from natural and casinghead gas taxes is up for the current fiscal year. Collections to date total $4,695,964 as compared with $4,300,258 for the same period last year. This reflects the Railroad Commission's strong campaign to conserve casinghead gas.

The decline in income from the crude-oil tax is presenting the state with some serious financial problems. Speaker of the House Durwood Manford figures that the next legislature, which convenes in January, will have to find $60,000,000 a year more revenue.

A newly-formed group, the Legislative Council, is studying the problem of reduced oil production, among others, to make recommendations to the next legislature. The council was set up by the past legislature to prepare facts and background material that might assist the next group of lawmakers.

Flare-Gas Problems

Vagaries of proration and fluctuations in production make pipe-line operation difficult, Southern Gas Association told

Leigh S. McCaslin, Jr.

GALVESTON.—The fact that the market demand for oil, not the market demand for gas, determines the quantity of flare (casinghead) gas available causes the gas marketer many difficulties.

Speaking here before the annual convention of the Southern Gas Association, Paul Kayser, president of El Paso Natural Gas Co., drew on the experiences of his own company to expound this theme.

El Paso Natural has petitioned the Federal Power Commission for authorization to build a pipe line of 167,000,000 cu. ft. per day capacity to cover deficiencies of flare gas due to proration orders of the Texas Railroad Commission, and to cover peak demands. It would be a 24-in. line to the San Juan basin of New Mexico from the company's Permian basin-California transmission line.

Kayser told his listeners that a cut in allowables might slash a gas pipe line's take by as much as 50,000,000 cu. ft. daily. He added that this usually occurs in the winter when the gas is most needed. To meet this problem two things must be done, the El Paso president said: (1) field lines, compressor stations, and treating plants sufficient to market the reasonable maximum quantity of gas that will be available under maximum production of oil must be construted, and (2) gathering lines, compressor stations, and treating plants must be built sufficient to connect with an adequate supply of so-called dry gas not associated with oil so that take from these sources can be increased to fill the gaps caused by any cut in available flare gas.

El Paso Natural is asking for the gathering line to the San Juan basin in accordance with this second point. It will make possible the operation of the 26 and 30-in. lines to California at 95 to 97 per cent of capacity both winter and summer. In addition, it will make possible the marketing of 20,000,000,000 cu. ft. of flare gas during summer months that heretofore has been burned in flares. Kayser pointed out that this quantity of gas is roughly equivalent to 3,300,000 bbl. of fuel oil.

Another major problem facing operators of gas transmission lines, according to Kayser, is that of insuring an even flow of gas from the producers. He pointed out that El Paso may receive little or no gas from a given plant at night and by 9 o'clock in the morning the plant may be delivering at the rate of 20,000,000 cu. ft. daily. In the over-all system there is a fluctuation from night to day of as much as 60,000,000 cu. ft.

Proration orders which cut the number of producing days in any given month also contribute to uneven flow into the gas lines. Kayser said El Paso may have as much as 100,000,000 cu. ft. a day cut off during the last 4 or 5 days of the month. Operators generally try to make their allowables a few days before month's end to eliminate any possibility of losing part of their allowable.

Kayser said that efforts are being made by producers in some fields to stagger the production of individual wells to provide a more even flow. However, he added, it may be necessary to have a full-scale hearing before the Texas Railroad Commission to arrive at a satisfactory solution.

In concluding, Kayser emphasized his theme by saying that 750,000,000 cu. ft. of gas (the amount his company expects to market daily in 1951) is equivalent to 125,000 bbl. of oil per day, or 45,620,000 bbl. per year.

Over-all theme of the Southern Gas Association's meeting here was the bringing of new industries to the South and Southwest. In line with this, Gov. Sidney S. McMath of Arkansas spoke at the closing luncheon Wednesday on "Industrialization of the South and Southwest."

The 3-day meeting attracted more than 1,000 registrants from the 13-state area covered by the association. L. L. Baxter, president of Arkansas Western Gas Co., Fayetteville, is retiring president of S.G.A.

New Products, Processes

Latest developments of chemical world applicable to the petroleum industry described at A.C.S. meeting in Houston

Leigh S. McCaslin, Jr.

HOUSTON.—New chemical products from petroleum, new chemical processes useful to the oil and gas industries, and some results of atomic research impinging on the petroleum industry were among the many topics discussed at the national meeting of the American Chemical Society here March 26-30.

Special symposiums were held on chemicals from petroleum, on synthetic lubricating oils, and on conditioning water for repressuring oil fields and for underground disposal.

The petroleum division heard 49 papers, mostly on technical problems in refining and petrochemistry. It awarded the $3,000 Ipatieff prize for achievement in the field of catalysis and high-pressure chemistry to Dr. Herman E. Ries, Jr., of Sinclair Refining Co., Harvey, Ill.; and the $1,000 Precision Scientific Co. prize to Dr. Kenneth S. Pitzer, director of research of the U. S. Atomic Energy Commission.

L.P.G. and antitrust.—The phenomenal growth of the liquefied petroleum gas industry could not have occurred if the antitrust laws had been enforced to break up bigness and integration in business, it was declared by Dr. G. G. Oberfell, vice president of Phillips Petroleum Co., Bartlesville, in one of the few nontechnical addresses before a general session.

The antitrust laws have reached the point of diminishing returns when their target becomes bigness itself, he said, as this will prevent coordination and utilization of facilities, equipment, and organization needed to carry research and development work to successful culmination.

Using L. P. G. as an example, Oberfell said that big business can sponsor research which small business cannot afford, but that the results of such research provide new opportunities for many smaller concerns and improve the general standard of living by providing more employment and new and better products.

The most effective way to make research ineffective is to attack big business and integration, he said, adding that performance similar to the L.P.G. industry could not now be repeated by an infant industry because of high taxes and the threat of the antitrust laws.

Synthetic lubes.—Synthetic lubricants will occupy an increasingly important place in the field of specialized lubrication, it was predicted by B. H. Shoemaker in opening a symposium on this subject at which he presided.

As long as their price remains high they will command only a small percentage of the total market, but if they take only 1 per cent of it they will become a very important chemical product, he said. Synthetic lubes were first made 10 years ago by a process which was discontinued because of high costs, but at present two oil companies are marketing synthetic hydrocarbons in the lubricating-oil range, made by catalytic polymerization of a butane fraction, and it is possible that polymerization of synthetic olefins may furnish part of our lubricants some time in the future, Shoemaker said.

A new synthetic lubricant which can be made from refinery byproducts, coal, or oil shale has quality standards not available from petroleum oils without elaborate procedures, the symposium was told by F. M. Seger of Socony-Vacuum Oil Co., Paulsboro, N. J.

This lubricant, Seger explained, is based on an intermediate chemical called decene and is somewhat similar to the high-quality lubricating oils produced synthetically in Germany by an expensive process requiring an extremely active chemical catalyst. The new product is made by polymerizing decene by heat without the use of a catalyst, and it has a viscosity index of 140 and a pour test of minus 10° F.

Excellent success in field tests of a new series of synthetic lubricants made from polyalkylene glycol was reported by Dr. W. H. Millett of Union Carbide & Carbon Corp., New York. He said these synthetic lubes have antiwear action 18 times better than petroleum oil, give superior service at temperatures from well below zero to 300° above, have all other desirable qualities of high-grade lubricants, exert a solvent and cleansing action on the gums produced by ordinary oils, can be produced in any practical density, and can be made in water-soluble as well as insoluble form.

Atomic energy.—The basic research on electron characteristics of hydrocarbon molecules which won him the award was explained by Dr. Kenneth S. Pitzer, now director of research of the Atomic Energy Commission, in his acceptance address.

This work showed that the patterns of the electrons can be ascertained and from this can be calculated a molecule's thermodynamic properties and how it will react under various refinery processes. This method, he explained, can improve refinery practice and produce new petrochemicals which otherwise could be achieved only by an almost impossible task of individual experiments.

Atomic engines for automobiles may be made possible by a new mechanism for the transmission of nuclear power, it was predicted by Dr. Dietrich E. Beischer of the U. S. Naval School of Aviation Medicine, Pensacola, Fla.

The new method spreads a solid film of fissionable atoms, one deep, on a tape in such a way that their power is given off at a uniform rate and only in one direction, and thus the tape could be fed into an atomic engine at any rate desired, he explained. However, long before there are atomic automobiles, this atomic tape will find many other uses in the application of radioactivity in industry, he declared.

Gas storage.—A new process of making city gas from propane, which he said would permit enough heating gas to be stored in liquid form to meet any emergency or peak-load requirement, was described by Dr. R. M. Deanesly of Universal Oil Products Co., Chicago.

This is an autothermic process in which propane and air are separately preheated to 1,000° F. and reacted together so that partial combustion of some propane converts the remainder into smaller molecules of gas. He said that the process requires relatively low capital cost and has a thermal yield of better than 98 per cent, and that the gas produced is suitable for domestic burning equipment and is produced at the proper pressure for distribution in city mains.

Water flooding.—The use of flood water much purer than drinking water will greatly improve the oil yield of secondary-recovery projects, it was reported by Dr. Joseph N. Breston, laboratory director of the Pennsylvania Grade Crude Oil Association, Bradford, Pa.

The pores of oil sands are so small that the presence of bacteria or minute quantities of chemicals will retard the flow water used in forcing out crude oil, he said, and he described a new and cheaper method of treating water for secondary-recovery operations by use of small quantities of organic chemicals. He said the new method is so economical and efficient that it has prevented the abandonment of many oil wells in the Bradford area.

Catalysts.—The theory that catalysts function because of physical or structural rather than chemical properties was expounded by Dr. Herman E. Ries, Jr., of Sinclair Refining Co., in his address accepting the Ipatieff award.

He reported on studies in which he measured the pore size and surface area of catalysts and discovered that 80,000 sq. miles of surface on the catalyst in a cracking chamber provide the reaction surface which makes possible the production of high-octane gasoline.

Antiknock antagonists. — The ability of tetraethyl lead to prevent engine knocking is materially impaired by "antagonists" found naturally in some gasolines, particularly sulfur compounds, it was reported by Dr. H. K. Livingston of E. I. du Pont de Nemours & Co., Wilmington.

These compounds have the property of forming free radicals in the combustion chamber which interfere with the antiknock action of metallic antidetonants but do not affect nonmetallic antiknock compounds, he said, and advised that antiknocks be classified by studying their behavior in the presence of antagonists.

Petrochemicals. — The availability of chemicals from petroleum foreshadows the growth of a large plastics industry in the Southwest, a symposium on chemicals from petroleum was told by Jack C. Wright and Glenn L. Pitzer of Union Carbide & Carbon Corp., Texas City. They said that the making of vinyl resin plastics is an integral part of the petroleum chemicals industry.

Microwaves Utilized

New spectrometer promises wide use in refineries to distinguish certain hydrocarbons from their derivatives

PHILADELPHIA.—A new analytical tool has been added to the long list of spectrometers used today in the oil industry's research laboratories.

It is an outgrowth of radar, and its very short radio waves can distinguish hydrocarbons from their derivatives.

In recent years, and especially since the war, the mass, Raman, X-ray, ultraviolet, visible, and infra-red spectrometers have found application in speeding analysis of complex hydrocarbon mixtures with new accuracy.

Recently, analysts have shown a growing interest in yet another phase of spectroscopy: the microwave which operates in the region of the very short radio waves employed in radar. This new tool is a direct outgrowth of radar. Many units were assembled from surplus radar components which generate and measure radiation of a wave length generally between 0.3 and 10 cm.

Originally, most of the work in microwave spectroscopy was directed to the solution of fundamental problems of molecular structure in university and electronic research laboratories. Atlantic Refining Co. has recently constructed a microwave spectrometer and is now studying its application as an advanced analytical tool, particularly in the field of chemicals derived from petroleum.

Supplementary tool.—The new unit is expected to supplement but not to replace existing spectrometers in petroleum laboratories. It is applicable to petrochemical work because it will distinguish certain hydrocarbon derivatives from the hydrocarbons themselves. This is because a molecule, in order to be active in the microwave region, must possess a permanent dipole moment.

Pure hydrocarbons do not possess this property, but such derivatives as ethylene oxide, carbonyl sulfide, and halogenated hydrocarbons do. Thus in mixtures of the two types, the microwave spectrometer may be used to determine the latter to the exclusion of the former.

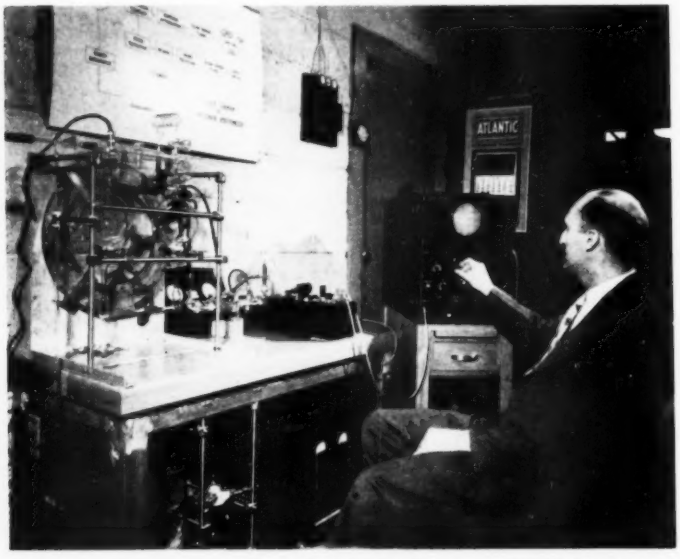
While its application is limited to certain types of molecules derived from pure hydrocarbons, the resolution in the microwave region is so great that there is room for some 5,000,000 noninterfering lines. In principle, at least, 1,000 or more different complex organic molecules could be quantitatively determined from a sample smaller than one-millionth of a gram without harming the sample.

This resolving power, or the ability to separate adjacent spectral lines so that they unmistakably appear as distinct lines, is 100,000 times better than that of the best infra-red spectrometer, according to Atlantic researchers.

Further, the microwave spectrum is a function solely of the over-all structure of the molecule and does not contain, as does the infra-red, features characteristic of groups within the molecule.

In analytical work, the two techniques are complementary rather than competitive. From the infra-red, the presence of characteristics or functional groups may be determined and their arrangement within the molecule may be determined from the microwave spectrum.

The microwave spectrometer offers another advantage where it applies. Frequency measurements in that region may be made with such accuracy that in most cases a compound can be identified by a single line. Thus spectra of various compounds may be designated as numbers rather than as graphs.



This microwave spectrometer, built at the Atlantic Refining Co. Research Laboratories at Philadelphia, is being adjusted for analysis of a hydrocarbon derivative contained in the coiled rectangular wave guide shown on the left. The new tool promises new possibilities in analyzing various petroleum derivatives.

New Method

Granular adsorbent latest gas-storage development

WARREN, Pa.—A new method for storing gas above ground was demonstrated here this week in a pilot plant constructed jointly by Floridin Co. of Warren and J. F. Pritchard & Co. of Kansas City.

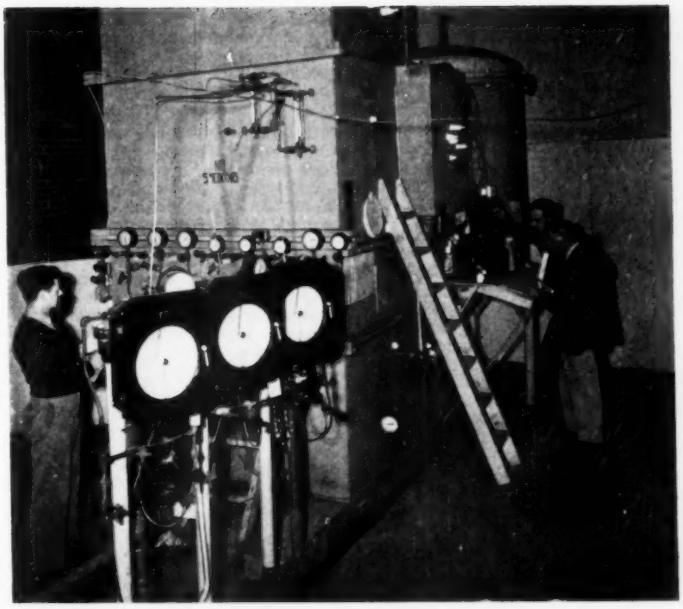
The method utilizes a solid, fireproof adsorbent material called "Methanite," prepared from fullers earth.

In the pilot plant, natural gas was compressed, cooled, and then preheated by adsorbents for the removal of moisture, gasoline, and liquefied pethroleum gases. The gas was cooled to remove ethane and to condense methane. The resulting liquid was then flashed to a low pressure for furthur cooling, after which it was introduced into the "Methanite" storage container. More than 600 cu. ft. of gas was put into 2 cu. ft. of the granduler adsorbent.

According to C. V. Spangler of the Pritchard organization, the demonstration proved that the natural gas stored at a temperature of —260 F. did not flow away as a liquid but was released slowly as a gas when exposed to the atmosphere. He said the method provides a safe means of storing gas with no more hazards than in ordinary operations of a gas plant.

Company officials predicted that the method will prove useful in storing natural gas against peak-load requirements of utilities and industrial users, and also that it can be used to store and ship butane and propane economically and safely, at atmospheric pressure and at the boiling point of each.

Construction of the pilot plant follows more than a year of laboratory experiments. Floridin Co. is a producer of earth adsorbents for various industries, and the Pritchard organization is a natural-gas engineering and construction firm.



Pilot plant at Warren, Pa., used in developing the new gas-storage system.

Pipe-Line Innovations

Transco gas pipe line will use steam-turbine centrifugal compressors; may have unique microwave communication

Paul Reed

HOUSTON.—Two radical departures from customary pipe-line practices are contemplated by Transcontinental Gas Pipe Line Corp. for its 1,800-mile line now under construction between South Texas and New York City, it was revealed here this week by Claude A. Williams, president.

1. Decisions have been reached by the company and Fish Engineering, Inc., to procure the first steam-turbine-driven centrifugal-compressor equipment ever to be installed on a natural-gas pipe line. Installation is subject to Federal Power Commission approval of a dozen additional stations.

2. Furthermore, Transcontinental is giving consideration to proposals for the building of the first extensive microwave communication system for a natural-gas trunk line. In fact, this would be the longest for any type of pipe line in this period when microwave communication is still in its infancy.

Since FPC granted Trancontinental, in the middle of this month, a "motion to dispense with intermediate procedure" in the handling of its application to install 140,000 hp. at 12 additional stations, there is a possibility of action being taken early in April. At least 9 of these 12 stations would be reciprocating types. Steam-turbine-driven centrifugal compressors have been selected for one of the remaining three stations and there is a strong possibility that the other two may be likewise equipped.

For Station No. 5 near Eunice, La., definite plans have been made for two Ingersoll-Rand 4,000-hp. units to operate in series to produce a 1.5 compression ratio. Furthermore, two other stations, No. 7 and No. 10, have been designated for steam-turbine centrifugal compressor installations, contingent upon determination of the availability of satisfactory water supplies. Test holes are to be drilled for this purpose immediately.

Station No. 7, near McComb, Miss., would have two De Laval Steam Turbine Co. 5,000-hp. units. Station No. 10 near Clanton, Ala., would have two Clark Brothers, Inc., 5,000-hp. units.

Big turbines. — Turbines will be of high-pressure condensing types to be operated at 5,000 r.p.m. maximum speed with steam furnished by 625-lb., 725° F. superheat water-tube boilers. At each of the three stations the two units would be installed to operate in series. No standby equipment will be necessary since either of the units will be capable of handling approximately 95 per cent of the normal load by increasing the speed at some sacrifice of efficiency under such operating conditions.

The steam-turbine centrifugal compressors are a drastic departure from the practices of the natural-gas industry, which has utilized reciprocating-gas-engine-driven units almost exclusively since the beginning of gas pipe lining with the exception of the electric centrifugal compressors developed in the postwar period for extensive installation on the system of Texas Eastern Transmission Corp.

and for one station of Tennessee Gas Transmission Co.

Efforts to utilize steam-turbine-driven centrifugal compressors for the Transco program were initiated by Williams a year and a half ago. At first fuel consumption seemed too high to warrant their use. Subsequently the efficiency of centrifugal compressors has been increased 50 per cent.

Studies now show that steam-turbine centrifugals have only slightly less B.t.u. consumption than reciprocating units. They would be much more economical than electric centrifugals. Investment in steam-turbine centrifugal stations is approximately $500,000 less per station than for reciprocating stations of same capacity. The steam-turbine centrifugal equipment is mechanically simpler; it is compact and light and so does not present the foundation problems encountered by reciprocators in some types of ground. Gas-turbine drive was not considered by Transco since it is considered to be still in the development stage.

Microwave versatile. — A microwave communication system is under consideration for the entire Transco line. This would provide 10 simultaneous channels which could be increased to 20. It would be free of static and storm interference. There would be no party-line talking, calls would be put through by dialing. Because of the narrow type of beam there would be slight chance of interception.

In addition to telephone-type communication, the system could be used for meter reading, teletype, opening and shutting of valves, and for facsimile transmission of hand-written notes. From an engineering standpoint it would be possible to forward calls from the microwave system through the Bell telephone system at any station or office. Patrol planes and mobile equipment such as cars and maintenance trucks could talk into the system through their two-way radios.

Since there will be a light on the top of each of the 100-ft. towers at 30-mile intervals, the system will be a convenient guide for aviation novices. A flight along the microwave system following the pipe line would be only 100 miles longer than the great-circle course from New York to Houston.

This month gas from a Southern Natural Gas Co. connection in Alabama used for pigging, blowing, and filling certain completed parts of the line. Such operations will be continued at 100-mile intervals as construction progresses northward.

ECONOMICS

Coal-Strike Results

Oil industry finds it has a 150,000-bbl. daily additional market for heavy fuel, with price structure favoring oil

Dahl M. Duff

NEW YORK.—John L. Lewis and his bituminous coal miners sold upwards of 150,000 bbl. daily of heavy fuel oil for the petroleum industry during the period of their recent strike.

This amount represents the estimate in the industry of the increased demand for residual fuel oil which can be reasonably attributed to the partial and later full shutdown of coal production.

Thus did oil again gain at the expense of its solid fuel competitor. More important than this market increase is the fact that the petroleum industry was able to pick up the additional fuel load and prevent widespread dislocation of industry and critical shortages of heat and power.

One major oil-company official, discussing this phase of the situation last week in New York, said the public in general did not realize fully the vital part the petroleum industry played during the coal strike. Had it not been for a flexible supply of residual fuel oil—and most of it due to imports—conditions in the East would have been chaotic.

Distillates as well as residual were important in preventing a breakdown of commerce and industry along the Eastern Seaboard and in the Midwest. The new diesel locomotives prevented crippling interruptions of the railroads, and the many commercial facilities heated by oil were unaffected.

Price factor. — The 150,000-bbl.-daily gain of heavy fuel oil from the strike is of course an estimate. How much of this the petroleum industry will retain is a much more difficult question. The two main factors are the price differential between the two fuels and the expected further inroads of natural gas in the fuel market. Taking these into consideration, it is felt that 75,000 to 100,000 bbl. daily represents a more or less permanent addition to outlets for heavy fuel oil.

At the present time the price factor weighs heavily in favor of oil. The heavy-fuel-oil price of $1.90 a barrel for bargeloads in New York Harbor represents an advantage for the industrial user of about 50 cents over a B.t.u.-equivalent amount of coal.

This spread naturally varies considerably depending on the grade of coal, the efficiency of the consuming equipment, handling charges, and other factors. At its best, coal has a 4.5 factor for converting a ton of coal to the heat-equivalent barrels of heavy oil. At the low industrial price of $9.80 a ton, this gives $2.18 as the price of a "barrel of coal." This is on the low side, and a $2.40 price, giving a 50-cent differential, is considered typical.

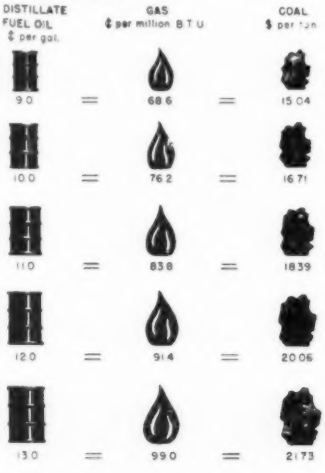
Future parity.—The long-time price outlook also favors heavy fuel oil. Barring drastic restrictions on fuel-oil imports—a development not expected among East Coast marketers—the oil price is likely to continue well below coal parity. One official expects residual prices to fluctuate from $1.50 to $2.25 over the next year or two.

No substantial decrease is anticipated in coal prices. Coal marketers in New York have talked of increases of up to 30 cents a ton to meet added costs from the mine workers' settlement, but there have been reports of unchanged coal prices and even some slight decreases to industrial users in the face of oil competition. Entering into coal prices are not only high labor costs but also transportation. Rail movement of coal adds much more to its price than the tanker movement of a comparable amount of oil.

The coal industry is well aware of the source of its principal oil competition and has joined the fight for curtailment of petroleum imports. In a recent industry bulletin, "Drowned

Equivalent Values of Competitive Fuels in Residential Retail Markets

(Coal: 13,500 B.t.u. per pound. Oil: 140,000 B.t.u. per gallon.)



in Foreign Oil," the National Coal Association said that "there are now almost 5,000,000 unemployed in this country, and there will be more very soon—or just as soon as coal catches up with orders on hand—simply because millions of tons have been displaced by foreign oil imported by the Big Ten American oil companies who show as little regard for the smaller oil producers as they do for the coal-mine owners."

Utilities shift.—For the large fuel consumer in a utility or factory, it is not the source of the fuel but the dollars-and-cents differential and continuity of supply that counts. One of the world's largest utilities, Consolidated Edison in New York, in 1946 used oil for about 6 per cent of its total fuel supply for gas, electricity, and steam heat. The company considers 185 gal. of Bunker C equal to 1 ton of bituminous coal (a conversion factor, ton to barrels, of 4.4).

In 1948, oil made up 10.2 per cent of Consolidated Edison's total fuel requirements, and in 1949 this was up to 18.8 per cent. With the coal shortage at the end of the year, this was up to 25 per cent, and during the strike the company stepped up its oil use to 60 per cent. The company now has half its boilers able to switch immediately to either fuel, and another 45 per cent converted to change over in from 2 to 4 weeks.

New Jersey Public Service Co. has increased oil use to about 90 per cent of its fuel requirements. Cleveland uses oil entirely for electric power generation, and in Philadelphia oil supplies some 70 per cent of the utility needs.

Long-range outlook.—In the recent gain in residual-fuel-oil demand, it is impossible to calculate precisely what part represents emergency load taken over during the short supply of coal and what is business attracted to oil by the relatively low price which existed prior to the commencement of the full strike. Balancing off part of the gain is decreasing use of residual by the railroads, by the military, and on the West Coast. As far as the latter factor is concerned, it was mainly competition from California's shipments of heavy fuel oil to the East Coast that caused the latest drop of 15 cents.

In the 4 weeks ended March 4, residual demand east of the Rockies was up to 1,430,000 bbl. daily. This is 260,000 bbl. daily over demand in the corresponding period a year ago. However, in December, before the full bituminous coal shutdown, demand was at 1,290,000 bbl. daily, or 140,000 bbl. daily under the more recent period.

Both coal and heavy fuel oil have suffered from the dieselization of the railroads, wider use of natural gas, and last year's warmer weather. However, residual fuel oil consumption has increased since 1941 by 31 per cent to about 495,000,000 bbl. in 1949. Domestic coal production, which in 1941 was 494,000,000 tons, was 456,000,000 tons in 1949 and even in 1948 was only 516,000,000 tons.

Utility use of bituminous coal was 61,900,000 tons in 1941. This was up to 97,000,000 tons in 1948, but in 1949, with lower oil prices, this was down to 81,000,000 tons. Residual used for this purpose in 1941 was 33,600,000 bbl. This increased to 61,000,000 bbl. in 1947 but dropped under the influence of high prices to 56,800,000 in 1948. In 1949, an estimated record amount of 75,000,000 bbl. was used, with 60,300,000 bbl. alone for electric-power generation.

Gas competition.—Just how much the advent of natural gas in large quantities in the Northeast will affect the heavy-fuel-oil market is a matter of conjecture. Natural gas will cut heavily into oil's present manufactured-gas-enrichment market. Another effect will be summer fuel-oil sales to industries where gas is sold at low rates on an interruptible basis to maintain peak load.

There are some officials in the petroleum industry who feel that in general whatever heavy fuel oil loses to gas it will be able to gain at the expense of coal, and the net result will be a rather steady demand.

A much less optimistic view was taken by A. J. McIntosh, economist with Socony-Vacuum Oil Co., Inc., whose recent study of competitive fuels, presented at the Western Petroleum Refiners Association meeting, is the most comprehensive discussion of the subject recently made public.

Home heating.—The effect of the coal strike on consumption of home-heating oil was much less important than with heavy fuel oil. Anthracite was in general not involved in the shut down but coal's recent labor difficulties had a psychological effect, giving more impetus to the trend away from solid fuel in this field.

With last week's seasonal reduction, the price of No. 2 oil to the consumer in New York is now 10.7 cents per gallon. The accompanying chart shows the relationship of coal, natural gas, and oil prices in the residential retail market. This indicates that the present oil price is comparable to coal at about $17.90.

Arriving at the present coal price runs into differences between the various grades. Coal appears to have a very slight edge over oil in the price of the lower grades. These, however, call for better and more expensive consuming equipment. The better grades of coal are at a distinct disadvantage, with Chesnut, for example, at $21.55. In home heating, the element of convenience often outweighs price.

25,000th LOG.—A special celebration marked the 25,000th well logged by Lane-Wells Co., run for Cities Service Oil Co. in the famous 1 Mary Sudik well March 24. Twenty years ago, March 26, 1930, "Wild Mary" discovered the Wilcox pay in Oklahoma City field and for 11 days sprayed oil and gas over the city. In recent years the well has been used for water injection in a secondary-recovery program, and the log was run to test pay possibilities in upper zones. The first radioactive log was run in April 1940 by Well Surveys, Inc., which later licensed the service to Lane-Wells. In this picture at the Sudik well are, left to right in the front row, Wylie Pitchford, Cities Service farm boss; Earl Ives, Cities Service assistant district superintendent; William Green, president, Well Surveys, Inc.; M. J. Kirwan, Cities Service manager of production; Rodney Durkee, president of Lane-Wells; and R. B. Downing, Lane-Wells Mid-Continent division manager.

Offshore Activity

Lack of settlement doesn't halt work off Gulf Coast; Shell now opening tenth field, Magnolia tests potential eleventh

Leigh S. McCaslin, Jr.

HOUSTON. — Despite the unsettled dispute over the ownership of the tidelands, offshore operators continue to explore and develop the Gulf of Mexico oil fields. While Shell Oil Co. is currently opening South Louisiana's tenth offshore oil field, Magnolia Petroleum Co. is preparing to test a potential eleventh, and The California Co. is completing two field wells.

In Block 24 of the South Pass area, Plaquemines Parish, Shell has run a successful drill-stem test on the 1 State Lease 1008. Through perforations at 11,293-99 ft., the well flowed at the rate of 375 bbl. of 30.7 -gravity oil daily through a 9/64-in. choke. The oil was flowing under a tubing pressure of 2,800 psi., but operators said that the pressure was falling slowly. Several other sands are present in the well, and there is a possibility that Shell will test other intervals before making completion.

This marks Shell's first successful offshore wildcat. The company has three field wells, however, in the Main Pass Block 69 field, the first of which was drilled as an offset to The California Co.'s discovery well.

Magnolia Petroleum Co. has two wildcats in the Eugene Island area off Iberia and St. Mary parishes which show promise of being productive. Operators have taken 17 cores from 7,621-818 ft. in their Block 125 wildcat, which has good shows of oil. In their Block 95 well, operators have drilled to a depth of 12,095 ft. and plugged back to 10,900 ft. in preparation to test.

Meanwhile, The California Co. continues to develop the Bay Marchand Block 2 field. Two new oilers were recently completed, and the company immediately staked two new locations. They are now drilling three wells in the Bay Marchand Block 2 field and two in the Main Pass Block 69 field.

Kerr-McGee Oil Industries, Inc., has secured a farmout from Union Oil Co. of California to explore Union's leases in the Breton Sound area of Plaquemines Parish. Kerr-McGee is now building platform to drill a 10,000-ft. test.

Currently, there are 16 wells drilling in the Gulf of Mexico—6 wildcats and 10 field wells. Since January 1, 1950, four new fields have been opened (excluding Shell's new well) 2 gas and 2 gas-condensate. This makes a total of 13 gas-condensate, 4 gas and 9 oil fields in the Louisiana tidelands.

	Completion date	Initial daily production Bbl.	Cu. ft.
Barnsdall Oil Co.—			
Breton Island Block 36, gas-cond.	9-30-48	78	
Breton Sound Block 32, oil	8-26-49	187	
Breton Sound Block 36, gas	4-11-49		2,360,000
The California Co.—			
Main Pass Block 69, oil	8-10-48	205	
Bay Marchand Block 2	3- 5-49	255	
Humble Oil & Refining Co.—			
Grand Isle Block 16, oil	12- 2-48	219	
Grand Isle Block 18, oil	8-16-48	878	
South Timbalier Block 34, oil	3-29-49	456	
West Delta Block 30, gas	4- 7-49		no gage
Tiger Pass Block 27, gas-cond.	11-15-49	24	734,000
Kerr-McGee Oil Industries, Inc.—			
West Cameron Block 33, oil	8-22-49	932	
Ship Shoal Block 32, oil	11-14-47	897	
Ship Shoal Block 28, gas-cond.	7-20-49	69	3,460,000
Magnolia Petroleum Co.—			
Eugene Island Block 110, gas-cond.	7-29-49	46	
Eugene Island Block 45, gas-cond.	11- 7-49	60	1,260,000
Ship Shoal Block 72, gas-cond.	8-20-48	118	
Eugene Island Block 58, gas-cond.	1- 8-50	7	449,000
Eugene Island Block 45, gas	1-23-50		1,350,000
West Cameron Block 8, gas-cond.	3- 1-50	27	3,893,000
Pure Oil Co.—			
Vermilion area Block 39, gas-dist.	6- 8-49	53	
Eugene Island, Block 32, oil	12-21-49	198	
Stanolind Oil & Gas Co.—			
West Cameron Block 45, gas-cond.	5-21-49	49	3,590,000
Superior Oil Co.—			
Vermilion area Block 71, gas-dist.	7- 2-48	53	7,024,000
West Cameron Block 149, gas-dist.	9-16-49	7	3,355,000
Vermilion area Block 76, gas-dist.	4-27-49	12	7,565,000
Phillips Petroleum Co.—			
East Cameron Block 1, gas	1-25-50		600,000

Louisiana's Loss

Digby says imports knocked $2,500,000 off tax income

NEW ORLEANS. — Lousiana's oil production for the year 1949 was approximately 10,000,000 bbl. less than could have been produced efficiently and without damage to the reservoir, according to Conservation Commissioner S. L. Digby.

Digby made the statement in response to questions concerning the importation of foreign oil. He said that Louisiana had been forced to cut allowables because of reduced market demand brought about by excessive imports. The commissioner remarked that the additional 10,000,000 bbl. of production would have brought revenue to the state of approximately $2,500,000.

He admitted that this large amount of revenue could not be considered a loss because the oil is still in the ground. However, he emphasized, it can greatly disturb the current economic structure of the state government. Digby said that the commission, in opposing excessive imports thus was not only protecting the interest of a very large majority of the industry, but of the state as well.

The Louisiana commissioner expressed himself as in full accord with the official policy of the Interstate Oil Compact Commission on imports. The commission does not object to sufficient imports to supplement the difference between domestic production and the market demand in the United States. However, it has gone on record as opposed to any imports in excess of that necessary to supplement domestic production to meet the market demand.

Louisiana Allowable Raised

BATON ROUGE.—The April Louisiana crude allowable has been upped slightly from the current figure of 534,869 bbl. to 536,528 bbl. daily.

Conservation Commissioner S. L. Digby said the state's depth brackets will not be changed. In Louisiana, the production of individual wells is regulated by setting limits by producing depths. The slight increase in allowable will be due to new production discovered.

The commission estimates that net April production will be 513,528 bbl. daily as compared with March's estimated output of 502,369 bbl. The new allowable, by districts, are: Houma, 91,945; Lafayette, 131,736; Lake Charles, 66,490; New Orleans, 122,546; Monroe, 71,524; and Shreveport, 52,017.

WATCHING WASHINGTON

Bertram F. Linz

Leaning Figures

Maybe figures don't lie, as has long been claimed, but in the hands of a smart government mathematician they certainly can lean, and according to U. S. Chamber of Commerce economists Commerce Secretary Charles Sawyer's recent report on the degree of industrial concentration in 453 industries is far from being on the up-and-up.

By figuring the per cent of sales in each industry made by the four largest companies, Sawyer got himself an index of industrial concentration, which is perfectly all right until one tries to find out what constitutes an industry.

Commerce took all steel as a single industry and got a percentage figure showing a high degree of concentration, which everyone knows exists. But when it got into some other industries some oddities developed.

For instance, chamber economists pointed out, the "bread and other bakery products" industry has more than 6,000 companies with the top 4 accounting for less than 20 per cent of the output. But by chipping off the "biscuit, cracker, and pretzel" manufacturers, Commerce got another industry with 249 manufacturers and a concentration in the top 4 of 71.5 per cent, and why stop there, the economists asked, when it could have set up a Nabisco Wafer industry and get 100 per cent?

In the case of oil, the report showed 277 refining companies with only 37.3 per cent of the output concentrated in the 4 largest, and maybe the government statisticians haven't yet figured out a way of cat-cracking in the industry to get something more striking, as they did with the bakers.

Lower Rates for Oil?

A regular free-for-all fight is under way between the railroads and the truck carriers for the privilege of hauling oil in 10 southern states.

The row started when the southeastern railroads, after the Interstate Commerce Commission granted a general increase in rates, asked approval of lower tariffs on petroleum.

The tank-truck carriers, who previously had taken the traffic from the railroads and didn't want to lose it, immediately protested to the ICC that the railways were trying to eliminate or weaken the competing truck industry.

The truckers charged the railroads admitted they had made no tests to determine whether the proposed rates would make for profit or loss, and asserted the latter would be the result. They alleged that, to get the business, the railroads were making rates based on air-line mileage, highway mileage, short-line rail mileage and in some instances rail mileage long since abandoned.

The railroads, which aren't doing too well, now realize that the business they didn't think was worth keeping when the trucks started to cut in on them has proved pretty profitable for their rubber-wheeled competitors and are fighting to get it back. And if the battle goes on long enough, the oil industry may get some pretty favorable freight rates—for a while, at least.

Under the Pile

Three months of the congressional session have now slipped away and so far the only part of President Truman's legislative program enacted into law is the repeal of the special taxes on oleomargarine.

With Congress aiming at a July adjournment and about to take a 10-day recess over Easter, the 1950 session is close to the half-way point, with little indication that the second semester will be much more productive than was the first.

Unfinished business includes tax revision, annual appropriations, rivers and harbors legislation, displaced persons, securities registration proposals, social security amendments and the President's most recent reorganization plans, with more on the way.

All of this adds up to a situation in which consideration of oil legislation will be submerged in the fights of administration leaders to salvage enough of the President's program to give him some credit in the impending congressional campaign.

As usual, a number of measures dealing with oil have been introduced but there is nothing that demands immediate consideration beyond possibly the import situation, and there is no indication that the President plans to do anything on that.

Further investigations of one phase or another of the oil industry may be pressed, but none of them, including Rep. Oren Harris' study of the need for a national oil policy, will result in legislation this year.

NATIONAL AFFAIRS

Taxes Deferred

Earnings frozen in foreign currencies given tax delay

WASHINGTON.—American oil companies and other foreign investors whose earnings are tied up in foreign currencies which they cannot convert into dollars will be permitted to defer paying taxes on their foreign income until they actually receive it, under a ruling issued by the Commissioner of Internal Revenue.

The ruling will extend to companies with direct operations abroad the same principle as has been followed in the past with respect to dividends from subsidiaries. Since the subsidiaries could pay dividends only when they converted their earnings into dollars, the parent companies already had the privilege of deferring the payment of taxes on blocked income.

Heretofore, companies operating in foreign countries were supposed to include their earnings in foreign currencies in their taxable income, even though they were not able to convert them. Some companies, however, have not been doing this, and the Bureau of Internal Revenue now has legalized deferment, providing certain conditions are met.

Under the ruling, it will be necessary to segregate blocked earnings from taxable income and report it separately. Certain requirements are set up with respect to the deduction of United States costs, which would be taken proportionately as foreign earnings were converted into dollars and became taxable.

In a message to Congress, President Truman recommended that the new tax law make some provision for foreign earnings, suggesting that foreign branches be treated the same as subsidiaries. No move has been taken by Congress to carry out the suggestion, which, however, now is covered by the bureau's new ruling.

British Ban Proposal

WASHINGTON.—American oil companies subject to the British order to substitute sterling for dollar oil were represented this week as dissatisfied with proposals now being worked out by the State Department for the amelioration of the situation they face in sterling markets.

The suggested proposals were distributed to the companies some days ago by the department in anticipation of another conference at which they would be put into final form, and included a suggestion that the companies agree to accept about 70 per cent payment in sterling for oil sold in the sterling area.

Most of the companies were said to

oppose the plan, expressing the belief that 60 per cent should be paid in dollars and only 40 per cent in sterling, representing approximately the relative dollar and sterling components in the oil itself.

Company officials are represented as pointing out that they couldn't get by on conversion of only 30 per cent of the income from sales and as leaning more toward other proposals that American oil be sold on the same dollar-sterling basis as the sterling oil, with the right to use some of the sterling revenue for operating and other expenses in the sterling area.

The idea of a 70-30 ratio has not been used by the department as an actual basis for the phrasing of proposals to the British, but was tossed out to the companies in rough form to give them something on which to base suggestions. The company executives are expected to come to Washington this week to discuss the matter with department officials and are said to have several recommendations for consideration by the latter.

Price-Index Revision

WASHINGTON. — The Bureau of Labor Statistics is engaged in a major revision of its wholesale price indexes for oil products and shortly will release new tables of prices over the past 3 years based on 1947 instead of the 1929-31 basis formerly used.

The new index will increase the number of priced items from 12 to 21, showing data separately for such products as gasoline, residual fuel oil, distillate, etc., which were not previously segregated.

The bureau is preparing to abandon the 1929-31 base for its price reports, but has not yet definitely decided upon 1947 as the new basis. Since January, however, it has been publishing its weekly price reports with 1947 as 100.

Fewer Committees

WASHINGTON. — The Department of Commerce is considering disbanding its industry advisory committees on petroleum and paraffin wax as part of a program to streamline the whole government-industry set-up.

The department is spearheading a drive to eliminate the duplication of advisory committees in favor of a system in which a single industry committee will serve all government agencies interested in that industry. Under this setup, the National Petroleum Council would serve as the clearing house on oil questions, with the Commerce Department and other agencies requesting its advice, when needed, through the Interior Department.

Announcing the department's plan, Acting Secretary C. V. Whitney pointed out it would save the time of industrial leaders whose unpaid services are sought by the Government in an advisory capacity.

Whitney disclosed that study of the advisory-committee situation disclosed that 27 of the 42 committees appointed to advise on export controls, including those on petroleum and paraffin wax, have been inactive and are slated for disbanding.

FTC for Oil Is Pushed

WASHINGTON.—A Federal Trade Commission of the petroleum industry, recently proposed by Rep. Clarence Cannon of Missouri in a resolution introduced in Congress, was given the backing last week of Missouri farmers.

In a letter to Cannon announcing his support, Fred V. Heinkle, president of the Missouri Farmers Association, asserted that since the resolution was introduced the price of gasoline has dropped about 1 cent a gallon in the Middle West, although he noted there has been no reduction in crude prices, and charged "the law of supply and demand has again been suspended by the monopolists."

"Farmers are sick and tired of these manipulated prices and the failure of all our antitrust agencies to get us any relief," Heinkle wrote.

Heinkle told Cannon that in 1946 farmers paid $1,170,000,000 for petroleum products, or some 8.2 per cent of their total production costs of $14,200,000,000. In 1948, he said, cost of oil products was $1,573,000,000 out of a total of $18,556,000,000, an increase in both total and percentage.

Tideland Arguments Heard

WASHINGTON.—The Supreme Court heard argument in the Louisiana and Texas tidelands cases this week, almost exactly 1 year after suits to assert the federal Government's "paramount rights" over the submerged oil lands of the two states were filed by the Department of Justice.

The Government argument was based on the precedent set in the 1947 decree in the California case, but counsel for Louisiana asked the court to overrule that decision which, he said, contained errors which make reconsideration desirable. The actual decree in that case, it was asserted, went further than justified by the court's opinion.

Counsel for both Louisiana and Texas contended that the situation of their state was different from that of California, Texas in particular relying heavily on the fact that as a once-independent republic full ownership of its submerged tidelands was vested in the state government.

Hearing of the cases originally was scheduled for more than a month ago but was postponed until Associate Justice William O. Douglas, seriously injured in an accident last year, returned to Washington.

It is expected that the court's decision will be rendered sometime near the end of the term in early June.

HIGHER COMPRESSION. *A new type of light automobile engine was announced this week by Willys-Overland Motors, Inc., claimed to obtain more complete utilization of modern gasoline. It has a compression ratio of 7.4 to 1, with 7.8 to 1 available as an option. It has an "F" head, a radical departure, with intake valve in the head and exhaust valve in the block. The extra-large single intake valve in the head is said to make possible a large air-intake opening and more complete combustion of the air-gasoline mixture in the combustion chamber. Its four cylinders develop 72 hp. at 4,000 r.p.m. The new engine is shown with its developer, Delmar G. Roos, vice president of the company.*

Youngstown preferred

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PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - TIE PLATES AND SPIKES.

Optimism in Refining

But it's a conservative outlook; McIntosh tells W.P.R.A. liquid-fuel sales in 1953 may be only 1 per cent higher

George Weber

SAN ANTONIO.—In an atmosphere of conservative optimism, members of Western Petroleum Refiners Association at the thirty-eighth annual meeting this week considered processing, economics, trends for the future, and controls of both the processing and government type.

Despite the small existing differential between crude and product prices and the steady advance in octane and other product specifications, gloom was notably absent and much talk outside formal sessions concerned future plans for plant modification and new construction.

Refiners were clearly warned against complacency however. In the president's address, R. W. McDowell of Mid-Continent Petroleum Corp. cited the current competition in making better products more cheaply, as a return to normal. But he strongly recommended direct attention to what he considered three threats to the industry: excessive imports, the attack on depletion allowance, and the Labor Department's efforts to establish additional and specific minimum wage levels, which may work to exclude the small refiner from the field of government contracts.

Walter S. Hallanan, president of Plymouth Oil Co., elaborated further on that subject. His address, "The Oil Industry Fights for Survival," sounded an emphatic warning against encroaching governmental controls on free enterprise. Industrial relations received attention in two addresses, by men outside the industry: John S. Bugas, vice president of Ford Motor Co., and John L. McCaffrey, president of International Harvester Co.

Platforming. — The topic of greatest interest at the meeting was a report on the new Platforming process, presented by Dr. Vladimir Haensel of Universal Oil Products Co., Chicago. The process was understood to have important possibilities in upgrading naphthas and straightrun gasolines, but details had been withheld prior to this meeting.

The full text of Dr. Haensel's paper on Platforming appears on pages 82-85 of this issue.

Demand forecast.—The probable sales of liquid petroleum fuels in 1953 may be only 1 per cent above 1950 because of increased competition from natural gas and liquefied petroleum gas, the refiners were told by Albert J. McIntosh, economist of Socony-Vacuum Oil Co., Inc., New York.

In a long-range discussion of trends in consumption of fuel oils and kerosine, well bolstered with statistical tables and graphs, McIntosh said that the full significance of the growth of natural-gas pipe lines has not been understood by the oil industry.

Natural gas equivalent to 518,000 bbl. of oil a day will be on the market in 1953 which is not available in 1950, he said, and just about one-half of this will displace liquid petroleum.

In the East Coast region, he predicted, the consumption of fuel oils will increase only 5 per cent between 1950 and 1953. Distillate fuels will increase substantially more than this, but the use of residual fuel oil will actually decline. On the West Coast there will be a decline of about 8 per cent in the consumption of all types of liquid fuels. Throughout the rest of the country there will be no change in total demand, as a fairly good increase in use of distillate will be offset by declines in kerosine and residual.

Additional natural gas, expressed in liquid-petroleum equivalents, will total 286,000 bbl. per day in 1951, 166,000 bbl. per day in 1952, and 69,000 bbl. per day in 1953, McIntosh calculated, but he warned that new gas-transmission lines may be scheduled during this period.

"The effects of these developments are far-reaching," McIntosh told the refiners. "We have calculated that by 1953 the gasoline yield would have to increase to a new all-time high of over 46 per cent out of the crude barrel, whereas combined fuels, we believe, would drop from the 44.5 per cent which we estimate as required for 1950 to below 42 per cent for 1953.

"These calculations have important implications for United States refiners. They simply say that the trend toward reduced residual yield should be hastened, that we have probably passed the high point for the yield of kerosine, but we would have to get set for new all-time-high yields of distillate fuel oils, particularly diesels, and gasoline. With the increased octane requirements for gasoline, this latter may pose a few problems.

"Regardless of this somewhat dismal outlook for liquid fuels, the total domestic consumption plus exports of all petroleum products should continue to increase, but rather slowly for the next few years."

The weather.—McIntosh also told the refiners they should make more careful studies of the weather and its effects on demands for their products. During the past winter, he said, consumption of all petroleum, including L.P.G., was about 26,000,000 bbl. below what it would have been if the weather had been as cold as normal.

"In our opinion," he said, "a great deal more attention should be paid to the general effect of the weather on the whole industry and much more publicity should be given to the calculations on the additional consumption or lack of consumption which results.

"It is increasingly important to adjust previous years' data to take into effect the changes of weather, and this should be done rather completely. We would even go so far as to say that no previous year's data should be used in any calculations unless they have been adjusted for weather."

Back to normal.—Now that the honeymoon is over, the historic condition of oversupply, to which refiners are accustomed, is with us again, observed R. W. McDowell, president of Mid-Continent Petroleum Co., Tulsa, in his opening address as president of W.P.R.A.

"Competition, seeking new outlets for ever-increasing quantities of refined products, has become progressively keener," McDowell said. "Price cutting has become more and more prevelant and most of our country's major markets have had substantial and rather general price reductions on all principal products.

"In other words, the refining and marketing end of the business is back to normal and it simply means that we must get back to the job of making better products more cheaply and that we must learn to sell more intelligently than we have for many years.

"Some of the things we as refiners and marketers have been indulging in are both foolish and costly. When you consider that in 1949 the demand for gasoline and heating oils in our territory again showed a substantial increase over the previous year and that our unsatisfactory price returns for refined products were probably the result of less than 5 per cent of oversupply, doesn't it seem as though a partial answer to our economic problems might be right on our own back yard?

"There has been too much pessimism talked in some quarters about the oil industry and its prospects for 1950. After weighing everything most carefully, I am inclined to view the future with a considerable amount of conservative optimism."

Instrumentation.—It is not unusual to

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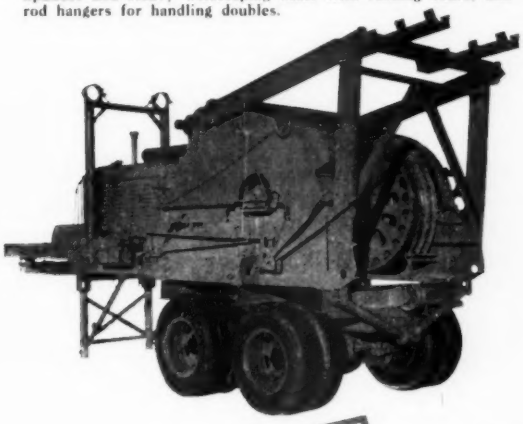

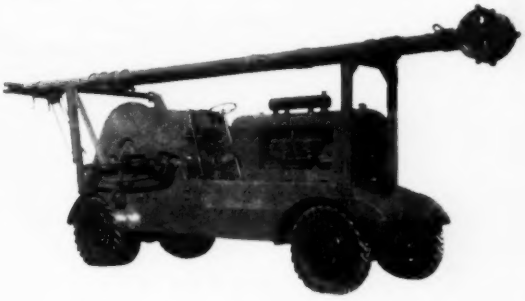

All model L Units are built in two sizes. Brakes 52" diameter by 10" width, capacity 11,500' of ¾" line; Brakes 42" diameter by 8" width, capacity 8,600' of ¾" line. Eight line speeds from 46' p.m. to 1,200' p.m. Maximum Line Pull 56,700 lbs.

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find a refinery today where well over a million dollars has been invested in instrumentation, said Douglas M. Considine, Minneapolis-Honeywell Regulator Co., Philadelphia, in his technical discussion on progress and trends in refinery instrumentation.

This investment, varying from plant to plant and with individual processes, is in the range of 3 per cent for solvent dewaxing units to 4.9 per cent for gas recovery units. These figures, expressed as the percentage of total capital-equipment costs, are representative for new installations.

Over a 10-year span, beginning with the year 1935, Considine said, the dollar volume of new instruments per million dollars of capital expenditures for new plants in the petroleum industry has arisen from $10,000 to $17,500. No other industry in the processing field even closely approaches this volume. The steel industry, in second position, spends about 60 per cent of that invested by the petroleum industry for new instruments.

Reviewing the economic reasons for the large expenditures for instrumentation, Considine said instruments:

1. Cut costs by freeing more labor for other duties, improving efficient use of fuels, supplying cost-accounting data, simplifying processing methods, and decreasing size and number of processing vessels.

2. Increase production by upping throughputs, reducing downtime, and increasing yields and quality.

3. Protect investment by safeguarding equipment and reducing hazards to life and limb.

Many of the analytical instruments employed originally in petroleum research are now being applied to processing operations. Several of these analytical devices which are extensively used in control and research laboratories have their counterparts as actual process-control mediums.

An example, pointed out by Considine to illustrate the trend toward automatic analytical methods, is the refractometer which continuously measures the refractive index of a flowing fluid. This apparatus is said to have opened new vistas for tower control. In modified form infrared and ultraviolet spectrometers, familiar instruments in quantative and qualitative determinations, have been adapted to continuous analysis and sometimes to control process streams.

Octane race.—Demand for motor fuels of still higher octane ratings will continue in the future, in spite of improvements in engine design which may provide "mechanical octane numbers," but this octane race has been responsible for increased efficiencies in fuel utilization which is saving a million barrels of gasoline a day, it was declared by J. M. Campbell of General Motors research laboratories.

"It is a fundamental principle of engine design that high compression gives greater combustion efficiency," he told the refiners. "This is as fundamental as the law of gravity. To be sure, there are other means of getting improved economy, such as lower axle ratios, smaller engines, transmission design. But high compression and high-octane fuel can always be added on to any improvements that can be made in these other directions.

"No doubt you have heard of rather phenomenal increases in compression ratio that can be obtained by ingenious engine design but without raising octane number. The automobile industry is very much interested in developments along these lines, and is actively engaged in research.

"Some of the engines in production today will require 95 to 100-octane fuel if you try to get every last horsepower that the engine is capable of producing. In some of these engines we are sacrificing from 5 to 10 per cent of maximum power by retarding the spark at full throttle to avoid detonation on commercial fuels. But we retain the advantage of the high compression ratio at part load where most of the driving is done.

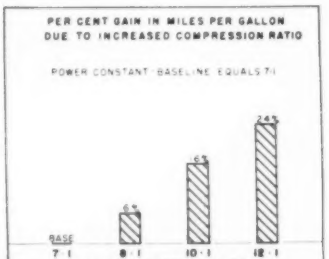
"If we assume that standards of automobile performance will stabilize at about present levels, we might expect fuel economy to improve, provided technological progress permits higher octane-number fuels at a cost which will not more than offset the gain in economy."

The G.M. expert also described the progress made jointly by the petroleum and automotive industries. During the past 20 years research octane numbers on regular-grade gasolines have come up about 20 octane numbers. This is about one octane number per year. At the same time, premium gasolines have increased about 15 octane numbers. Compression ratios have increased from 5:1 in 1930 to 7:1 in 1950.

General Motors' records, Campbell said, show that during this same period the average fuel consumption of all domestic passenger cars has increased from 28 ton-miles per gallon in 1930 to 39.5 ton-miles per gallon in 1949. These figures, representing the average computed at 20, 40, and 60 miles per hour, constitute an overall gain of 41 per cent in efficiency of fuel utilization. Between 1948 and 1949 there was an increase of 5 per cent in ton-miles per gallon, and Campbell said that if continued over a period of years this would result in a very significant increase in fuel economy.

If only one-half the increase in ton-miles of transportation per gallon of fuel has been due to increases in compression ratio and octane number alone (and G.M. thinks that this is a reasonable assumption), Campbell estimated that at the 1930 rates of fuel consumption it would take about a million barrels per day more gasoline, or over 2 million extra barrels of crude per day, than is used to do the transportation job we are doing today.

That is, Campbell emphasized, "a record of conservation that has been made entirely through technological progress—better fuels followed by better engines to use them." And he noted, "I put the better engines after the better fuels because the engine must follow the fuels."



Gain in tank mileage per gallon obtained in tests by General Motors.

Pro-Imports

Socony-Vacuum president says rate not now too high

NEW YORK.—Current imports of foreign petroleum into the United States are not too large, in the opinion of the management of Socony-Vacuum Oil Co., Inc.

This was stated by B. Brewster Jennings, president, in a foreword to the company's annual report, distributed this week.

"We do not believe that net imports, currently amounting to less than 9 per cent of domestic demand, could be considered as having any substantial adverse effect on the domestic industry," he said.

"On the contrary, it is our view that a reasonable volume of oil imports is in the national interest because of the importance to our country of having foreign oil readily available, the need of approaching a better balance of international trade payments, and, perhaps most important of all, the prudence of husbanding our own country's oil resources.

"Fears that oil imports might make us dependent on distant sources of supply that would be cut off in an emergency seemingly ignore many important strategic considerations."

Foreign restrictions.—Jennings reported that overseas operations have become increasingly difficult because of the restrictive effect of the world-wide dollar shortage, and added:

"We can appreciate the hard problem faced by these foreign nations without subscribing either to the wisdom or fairness of some of the re-

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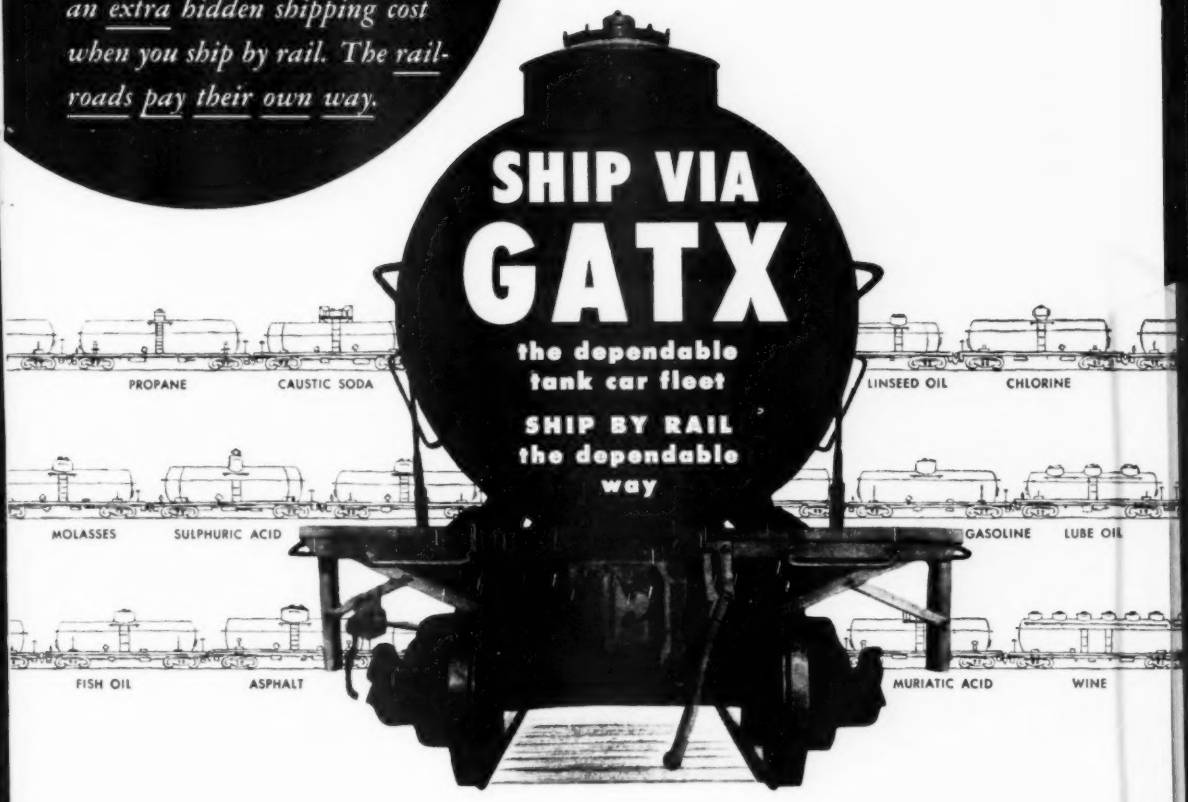

Among the more than 200 types of GATX tank cars, there's a specialized car for taking every type of bulk liquid everywhere the railroads go. These cars are built in General American's own plants to specifications which reduce customers' handling costs and shipping time.

To keep the 41,000 GATX cars rolling, a network of completely equipped General American maintenance shops is in operation. A GATX car is never more than a few hours away from servicing.

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NEW-TYPE PIPE.—Here examining a 1-ft. section of a new pipe made out of styrene-base plastic are: Standing: Sam Lewis, consulting engineer, Perrault Bros., Tulsa; Don Boggs, Omaha, who developed the pipe; Bob Shackleford, sales manager for Perrault. Seated: Lewis and Ainslie Perrault, who head the firm. Boggs, who has a great deal of experience in design of lightweight materials for aircraft, was 2½ years in developing the pipe. It is noncorrosive, weighs approximately one-sixth as much as steel, and has a tensile strength of 20,000 psi. Weighing 1¾ lb. per ft., the pipe is composed of 65 per cent liquid thermosetting resin by weight and 35 per cent glass fibers. Perrault Bros. is in the stage of designing and constructing production machinery and expects to be in production next fall. The company expects an initial production of 5,000 ft. per day with an eventual output of 20,000 ft. per day and will manufacture 3 to 10-in. diameter pipe in 20-ft. lengths for field assembly or in 40-ft. lengths with perma-set factory joints.

strictions imposed in their attempts to solve it. Too little concern has been shown for the ultimate effect on other countries, particularly those where the oil is produced.

"Because oil royalties constitute such a large proportion of total revenue in most oil-producing countries, any serious reduction in their oil production would cause serious repercussions. Also disregarded has been the serious prejudice to American-owned concessions from a sharp cutback in their operations while oil production under the control of other nationals has been increasing. This consideration is of vital importance to our country which some day may have to rely in part on imports of oil for its domestic requirements.

"Because some reasonable solution is so obviously in the interest of all concerned, we believe that ultimately ways and means will be found to let American oil companies continue to compete in the international oil business. It is unrealistic to suggest that we might be shut out of that business for a few years, while the dollar shortage is acute, and then resume where we left off."

"To develop and hold concessions without markets for the oil they produce is obviously impossible. We believe that it is important for all peace-loving nations to take all reasonable steps to facilitate the expansion and balanced growth of international trade."

NEXT WEEK

New Oil Recovery Process.—Much publicity attended recent announcement of Atlantic Refining Co. that its research laboratories have developed an oil production recovery method (high-pressure) that would attain higher ultimate crude-oil recoveries. First detailed paper by Atlantic will be published in next week's issue, explaining theory, laboratory research equipment used, experimental results, other information.

The Journal Visits First Commercial Installation of "Platforming."—George Weber, refining editor, gives on-the-spot data including flow charts, photos, performance data, product yields, and investment costs for new unit at Old Dutch Refining Co., Muskegon, Mich.

Also.—Feature articles concerned with drilling, production, and pipeline operations.

MID-CONTINENT

Price Fixing Held Legal

OKLAHOMA CITY.—The Oklahoma State Supreme Court last week upheld for the second time the right of the state Corporation Commission to fix natural-gas prices when it refused to rehear a case presented by Cities Service Gas Co.

The case arose out of a commission order raising the price of natural gas in the Hugoton-Guymon field to 7 cents per 1,000 cu. ft. The price had previously averaged about 4 cents. The commission based the order on its authority to prevent waste of oil and gas. The court ruled on January 17, in the first test of its kind in the country, that such price fixing by the commission was legal.

Cities Service disclosed that it plans to appeal to the United States Supreme Court.

Kansas Allowable Raised

WICHITA.—Kansas' allowable has been raised for the first time in 3 months. April's figure has been set at 275,000 bbl. a day—5,000 bbl. higher than that for any month since December when it was the same. It is still down 10,000 bbl. daily from November.

Chairman Jeff Robertson, Corporation Commission chairman followed the recommendation of T. A. Morgan, Conservation Division director, who pointed out that stocks were down and purchaser nominations were up 4,537 bbl. daily to 287,383 bbl. per day.

Oklahoma Allowable Up

OKLAHOMA CITY. — Oklahoma's April crude allowable this week was fixed at 447,628 bbl. daily.

The figure is an increase of 40,355 bbl. over the March allowable and is about 26,000 bbl. daily above current production. The 447,628-bbl. figure is identical to total nominations of purchasers, submitted this month for the first time since before the war.

In increasing the allowable, the Corporation Commission restored the February per-well allocations.

The Bureau of Mines had forecast Oklahoma's April demand at 415,000 bbl. daily. February production was 408,087 bbl. daily.

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Because of an ever-increasing demand from our customers for larger bit sizes, we are now offering Hawthorne Replaceable Blade "Blue Demon" Rock Cutter Bits in sizes from 5⅝" up through 7⅞".

Hawthorne "Blue Demon" bits in these larger sizes have been thoroughly field tested and have proved capable of efficiently drilling the soft and medium hard formations and many of the hard formations as well. Drilling speeds and footage per bit are approximately the same as the popular make of roller bits in the medium hard formations and 2 to 3 times greater in the softer formations!

Hawthorne "Blue Demon" Bits *increase your profits* by *decreasing your cost per foot.*

1. *Savings on drag bits.* Hawthorne bits will consistently drill many times more footage—faster—than the common drag bit.
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3. *Increased production from your rig.* The greatest savings available from use of Hawthorne bits is from increased production. Since these bits will drill the soft and medium hard formations, and many of the hard formations as well, there is no lost time in making round trips.

You owe it to yourself to check the important savings now available to you with "Blue Demon" Rock Cutter Bits. In some instances cost per foot has been reduced as much as 50%. For full information see your nearest Hawthorne representative or write direct to:

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How HYCAR tames the mud that bites

IN drilling for oil, the fluid that lubricates the bit as it whirls at the bottom of the hole is known as "mud". This fluid is always abrasive, more so as it circulates back to the surface loaded with cuttings and sand.

Mud is circulated by a reciprocating-type slush pump, shown in the picture, and it is right here that Hycar does a great job. The valve seat inserts, a vital part of the pump, are made of Hycar. As the mud goes round and round, Hycar meets every challenge of tough operating conditions.

Drilling operations are carried on at high pressures, 800 to 900 pounds. When pumps are doubled up, as high as 2500 to 3000 pounds. So the Hycar valve seat inserts must be able to stand high velocities as well as the "biting" action of the mud at normal pressures.

Often gas and oil from the drilling contaminate the fluid. Here, again, Hycar performs. For not only is Hycar gas-and-oil-resistant, it is unaffected when chemicals such as caustic soda are added to the mud. Through all drilling operations, Hycar retains its strength and toughness.

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When drilling operations stop and the pumps are stacked, Hycar "sits it out" without deteriorating. The Hycar compound used will not stick to its steel core or the valve seat.

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EUROPE

New British Refinery

Socony-Vacuum, British firm to build 20,000-bbl. plant in England to process sterling crude; opening set for 1952

SOCONY-VACUUM OIL CO., INC., has announced plans to build a new 20,000-bbl. daily refinery in England in partnership with Powell Duffryn, Inc., a British firm.

The refinery, to be located in Coryton, south of London, will cost about $30,000,000. It is expected to be in operation in about 2½ years, or in the fall of 1952.

It was announced March 24 in New York and in London that Vacuum Oil Co., Ltd., Socony-Vacuum's British subsidiary, will be merged with Cory Bros. & Co., Ltd., a wholly owned subsidiary of Powell Duffryn. Socony-Vacuum and Powell Duffryn will hold equal shares in the combined company.

What it means.—For Socony-Vacuum the move represents in part an arrangement to maintain a position in the United Kingdom market in the face of British restrictions against dollar-oil outlays. Standard Oil Co. (N.J.) the major American oil company operating in the United Kingdom, is now building, through its affiliated Anglo-American Oil Co., Ltd., a refinery of more than 100,000 bbl. daily capacity at Fawley in the south of England.

Both Socony-Vacuum and Jersey Standard hold minority interests in the Middle East Pipe Lines, Ltd., and through this projected line from Iran to the Eastern Mediterranean, the two United States companies will take sterling crude oil from Anglo-Iranian Oil Co., Ltd., production in Iran. Both the Jersey Standard refinery and the newly projected Socony-Vacuum plant will come into operation at about the same time, and this will roughly correspond to the expected end of the Economic Cooperation Administration under which Britain is now able to continue dollar-oil purchases. Jersey and Socony also have sterling crude available from their 23.75 per cent interest in Iraq Petroleum Co., Ltd.

A Socony-Vacuum official said that the merger and plans for the refinery were related generally to the present international oil situation in which United States companies are finding it increasingly difficult to do business in foreign areas on account of the dollar shortage. However, it was also said that the new arrangements of Socony-Vacuum provide for protection of both foreign profits and capital outlays in terms of United States dollars. This means, presumably, that Socony-Vacuum has made some compromise arrangement with the British Government for certain dollar remittances in connection with the project.

For the British refinery industry, negligible before the war, the new Socony-Vacuum plant will mean the addition of another 1,000,000 tons, approximately, to the nearly 19,000,000 tons now in operation, building, or planned. The company announcement said the refinery would specialize in the production of high-grade lubricating oils and would process Middle East crude oil primarily.

To replace imports.—The output of the refinery will replace products now imported into the United Kingdom from dollar sources, mainly the Caribbean area and Venezuela. Though centering on lubricating-oil production, the new refinery will produce a complete line of petroleum products. The announcement said plans for the project had been under discussion for several months.

Cory Bros. & Co., Ltd., the Powell Duffryn subsidiary, now carries on an oil storage, blending, and packaging business; Vacuum Oil is a processor and distributor of lubricants and allied products. To accomplish the merger, the number of directors of Vacuum Oil will be increased, as well as the number of shares outstanding.

Before the nationalization of the coal industry in the United Kingdom, Powell Duffryn was the largest coal-mining concern in the country, and was also engaged in coal distribution. It also has other trading activities—and through subsidiary companies operates a network of depots overseas with direct trading associations with most of the countries of the world. These outlets are expected to increase distribution of petroleum products emanating from Socony-Vacuum's Middle East sources.

French Wildcat Finds Oil

New oil production has been found in a well near Lacq, about 30 km. (19 miles) northwest of Pau in southwestern France.

The operator is Soc. Nationale des Petroles d'Aquitaine which holds a concession over some 6,300,000 acres in Aquitaine.

The well was reported to be making 110 bbl. daily from the Upper Cretaceous at 2,330 ft. Testing under way in a second well about 500 m. from the first appeared to confirm the discovery results. The second well was at a depth of 2,652 ft.

Pau is about 50 km. (31 miles) north of the Spanish border. Crude from the new producer was being shipped to the Pauillac refinery of Cie. de Raffinage Shell-Berre on the Gironde estuary.

Several other wells are being drilled in this Pyrennes foothills region. These include tests at Jurancon, Artigueloutan, and Garlin. About a year and a half ago, the Aquitaine company found oil in a well at Lalongue near Lembeye, but commercial production apparently was not sustained. Another Aquitaine well set a depth record for Europe at 13,870 ft. and had encouraging shows.

The Aquitaine company is 62 per cent owned by the French Government, and its operations are part of the intensive exploration program being carried out in metropolitan France and French overseas territories with the support of the government.

Caltex Refinery Operating

The new 20,000-bbl. daily refinery of Caltex Petroleum Mij., N. V., at Pernis, a suburb of Rotterdam in the Netherlands, has gone into initial operation.

Work on the refinery was started in August 1948, and Arthur G. McKee & Co., Cleveland, had the contract. Facilities include a two-stage crude unit, a 6,500-bbl. daily thermal reformer, a 6,400-bbl. daily Dubbs unit, nonselective polymerization, and Edeleanu SO_2 extraction.

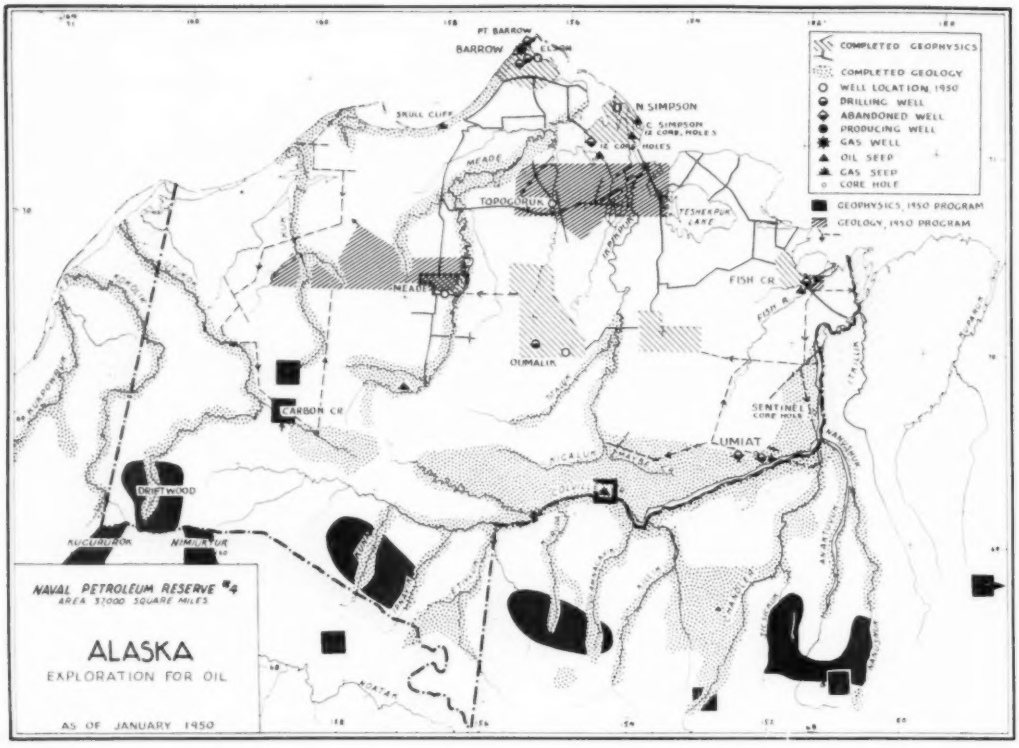
Crude oil is being received from Bahrein. The refinery is designed primarily to supply the Benelux countries. Storage facilities are being provided for approximately 1,600,000 bbl. of crude and products.

French Agency to Disband

Groupement d'Achat des Carburants, the joint French-oil industry agency for the purchase of petroleum products, is scheduled to cease operations in about 2 months.

Dissolution of GAC, as the agency is known, marks another step in the direction of full return to private operations in French oil importing.

Crude oil, the principal French import, was returned to the system of direct importation by the French companies about a year and a half ago. The only shipments handled by GAC since have been lubricating oils in bulk, amounting to 3,000-4,000 tons a month, and certain other specialties such as aviation fuel.



Oil Search in Alaska

Navy plans seven wildcats this year, one possibly going to 15,000 ft.; geological, gravity meter work continues

THE U. S. Navy plans to drill seven tests in 1950 in Naval Petroleum Reserve No. 4. The reserve, on which exploration work has been under way since 1944, consists of 37,000 sq. miles, all located in Arctic Alaska. The main operating camp is near Point Barrow.

Four of the wells to be drilled this year will be located on untested geological structures, and the other three wells will be drilled in areas on which new exploration data have been obtained following the drilling of dry holes.

Plans for 1950.—This 1950 drilling program will total approximately 40,500 ft. which compares with 35,000 ft. drilled in 1949. The drilling this year will be done with two drilling crews instead of four crews which were used in 1949. The Navy will also drill a standby gas well near Camp Barrow. One well now supplies natural-gas fuel for the operation of the camp. Two shallow experimental tests to determine permafrost characteristics in critical areas are also scheduled.

This year's program provides for continued extensive exploration work at several points in the reserve. Seven geological parties will be in the reserve during the summer months studying areas which it is believed will contribute information of value to the Navy's program. Five seismograph parties and one gravitymeter crew will continue the geophysical work under way since 1946.

One of the geological field parties will be supported by two U. S. Navy helicopters while the gravity-meter party will operate with two contracted helicopters so as to cover a large area on 2-mile spacing. The gravity-meter work is designed to fit in with the activities of two of the seismograph parties.

While definite programs for 1951 will not be decided upon until the results of this year's work are known, the Navy plans on continued exploration through 1951 and 1952. The tentative schedule provides for an increase in the number of geological and geophysical parties in the area during that period. Those in charge of the Navy program are encouraged by the results obtained so far and they are optimistic as to the probable definite results over the next 3 years, in which entirely new areas will be tested.

Results in 1949.—During the past season one test was drilled to a depth of 2,900 ft., another to a depth of 7,020 ft. and a third test is still drilling at 11,400 ft. Twelve core holes were drilled to depths varying from 900 to 1,400 ft. The core holes were drilled near the large seeps on the Simpson Peninsula. One of the core holes blew out and caught fire but later plugged itself off.

In the three main tests there were showings both of oil and gas. The deepest test may be drilled to 14,000 or 15,000 ft., depending on the formations encountered during the next month. The geological and geophysical programs of 1949 are largely the basis for this year's drilling program.

History.—Naval Petroleum Reserve No. 4 was established in 1923 by President Harding. Some geological work in the area was done by the U.S.G.S. during the '20s and '30s, but no actual drilling got under way until 1945 under the direction of the Seabees.

After the war the Arctic Contractors, Inc. (Hoover, Curtice & Ruby, the C. F. Lytle Co., and Green Con-

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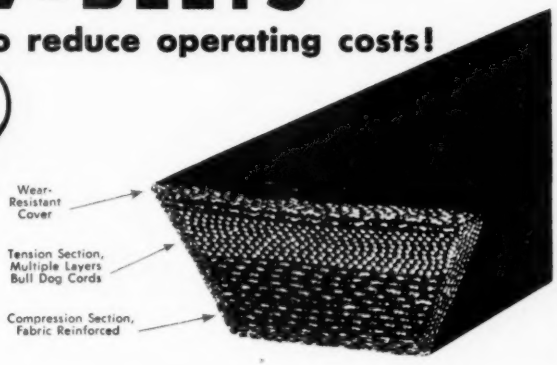

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Wichita Falls ..... Texas
Wichita ..... Kansas

struction Co.) was organized to continue the work. United Geophysical Co. has carried on the seismograph work, and the United States Geological Survey is in charge of the geological work under contract with the Navy. Since 1945 an extensive exploration and drilling program has been under way covering a large part of the reserve. The accompanying map summarizes this activity up to the first of this year.

Commodore W. F. Greenman, with headquarters in Washington, D. C., and Fairbanks, Alaska, is in charge of the work for the Navy.

LATIN AMERICA

June Opening

Bermudez says new refinery at Salamanca nearly ready

WASHINGTON.—Mexico's new $12,000,000 Salamanca refinery, 180 miles northwest of Mexico City, is now in the final stages of construction and will be in full operation within 3 months, it was announced last week by Sen. Antonio J. Bermudez, director general of Petroleos Mexicanos.

The announcement, issued through Pemex's Washington information service, said the new plant, designed for a capacity of 30,000 bbl. of products daily, will increase Mexico's petroleum-refining capacity to about 190,000 bbl. daily. Programmed production of the Salamanca refinery is 11,600 bbl. daily of motor gasoline, 13,740 bbl. of fuel oils, 3,210 bbl. of kerosine, 1,000 bbl. of diesel oil and 400 bbl. of liquefied petroleum gas.

The refinery will be tied to production in Poza Rica field by a 280-mile 12-in. pipe line recently completed at a cost of approximately $11,000,000, Bermudez stated. The entire cost of the $23,000,000 project, he said, was financed by Pemex out of earnings.

The refinery will include units for thermal cracking, atmospheric crude-oil distillation, catalytic desulfurization, naphtha stabilization and miscellaneous treating, and will have its own steam-generating and power facilities and a complete water system. The 910-acre tract on which the refinery stands will also have a large tank-car repair shop, tankage with a capacity of approximately 1,200,000 bbl. of crude and products, a railroad, fire-fighting, carpenter, machine, and welding shops, and housing for employes.

Construction is being handled directly by Pemex, it was said, with Arthur C. McKee & Co., Cleveland, as engineers and contractors, furnishing a limited number of skilled supervisors. Requirements for United States materials and services amounted to approximately $15,500,000, with an estimated more than 400 U. S. firms participating in one way or another.

Creole's Operations

Creole Petroleum Corp.'s new Amuay Bay refinery on Paraguana Peninsula in northwestern Venezuela, which went on stream January 4, processed an average of 47,484 bbl. daily during the month.

Creole also refined 10,828 bbl. daily at La Salina plant during January but the closing down of this refinery was to be completed at the end of the month. At Caripito in Eastern Venezuela, Creole's runs amounted to 59,707 bbl. daily.

The company's report for the month shows a daily average production of 614,088 bbl., down slightly from the 622,855 bbl. daily in December. Of the January daily average, 487,457 bbl. was from Lake Maracaibo, 3,473 bbl. from Cumarebo, and 123,158 bbl. from Eastern Venezuela.

Rigs in operation dropped further with an average of 9.8 running during January. Eight field wells were completed, one dry. Three exploratory wells were completed, one dry in Cumarebo with a depth of 7,397 ft. The two successful exploratory wells were in B. C. F. with 1,088 bbl. daily average initial production and 9,846 ft. average total depth.

FAR EAST

Philippine Oil Law

Official denies it is major obstacle to foreign capital

NEITHER the agreement giving Americans equal rights with Philippine citizens only until 1974 nor the qualified refinery obligation in the 1949 Philippine oil law should be major obstacles to oil exploration in the islands by foreign capital, according to Dr. Demetrio Andres, director of the republic's Bureau of Mines.

The Philippine law *(The Oil and Gas Journal, November 3, page 49, and February 2, page 36)* allows concessions to Philippine citizens and corporations 60 per cent Filipino owned. Under an exclusive agreement, United States citizens hold such rights until 1974.

Irrespective of the time limit set in the agreement, American and other foreign operators under Sections 5 and 13 of the oil law can undertake exploration work as independent contractors even beyond 1974 through a contract with the Philippine Government under such terms as may be agreed on.

The Philippine Government recently has been considering constructing a refinery to use imported crude. The law requires an exploitation concessionaire to build a refinery if his production reaches 10,000 bbl. daily with reserves of 140,000,000 bbl.

Philippine officials are hopeful of interesting large American operators in exploration in the republic, and the law was enacted with this in view. There is no commercial production at present.

CANADA

New Brunswick Abandoned

Shell Oil Co. of Canada, Ltd., has abandoned its exploratory effort in the Province of New Brunswick in eastern Canada.

The company has had 3,000,000 acres under lease in New Brunswick, mostly in the southern part where there is already some production from a small field.

For more than 2 years, Shell carried out gravity, seismic, and surface surveys of the area and drilled five exploratory wells. All of these were dry. Highly complex geological conditions were encountered which resulted in the conclusion that further exploratory expense was not justified, according to a company official.

James Bay Project

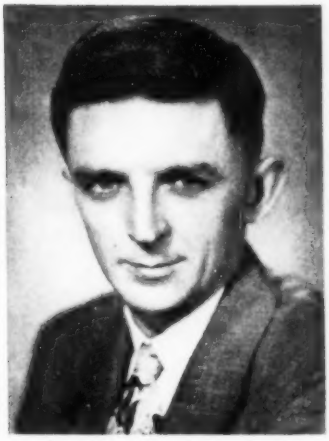
The Ontario Mines Department is going ahead with plans to drill for oil and gas this year on the west shore of James Bay, between the Albany and Moose rivers.

A tractor train, battling severe weather conditions, has reached Piskosi Point on the west shore, where some 4,000 tons of equipment are being unloaded for the most northerly geological project ever undertaken by the department. The shallowness of coastal waters prevents heavy equipment being unloaded by boat.

Underlying strata in an area approximating 20,000 sq. miles between the Albany and Moose rivers are chiefly of Paleozoic age, including the Devonian formation, productive in recently discovered Alberta fields. Gas and oil have been found in formations of similar age in southwestern Ontario.

Diamond drilling by the Mines Department was commenced in the James Bay area in 1948. The first test entered the Paleozoic around 1,100 ft. Last summer, a second hole was started at Jaab Lake, 70 miles northwest of Campbell Lake. The Jaab Lake hole, unfinished at freeze-up, will be completed this year, with work expected to commence about June 1. When the Jaab Lake hole is finished, the crew will move to the James Bay location for a third test. The three diamond-drill tests are expected to provide the necessary minimum of geological information to interpret the regional structure of the Paleozoic formations.

PERSONALS



Steps Up

Great Lakes names Kramer new general superintendent

A. P. KRAMER, assistant to the general superintendent of Great Lakes Pipe Line Co., Kansas City, Mo., has been appointed general superintendent of the company.

In his new position, Kramer takes over part of the responsibilities of J. B. Lawson, vice president, who until Kramer's appointment, had also served as general superintendent.

Prior to being named assistant to the general superintendent, Kramer served as supervisor of pumping stations for the northern area, which encompasses lines of Great Lakes between Kansas City and Minneapolis, and from Des Moines to Chicago.

Kramer will supervise activities of the company's common-carrier system, which transports refined products from Oklahoma and Kansas refineries to 14 delivery terminals. Great Lakes is now engaged in a $55,000,000 expansion program which will virtually double capacity of its system, and Kramer will take on added responsibilities with a thorough background of the pipe-line business.

Bill G. Harmon, formerly engineer for Superior Oil Co. at Crossville, Ill., has joined Summit Oil & Natural Gas Corp., Salem, Ill., as production superintendent.

R. G. Parker, formerly assistant district production superintendent of the Wichita Falls area, Continental Oil Co., has been appointed superintendent, replacing **C. R. Graham,** who resigned. **C. C. Wilson,** formerly production foreman in the Big Spring, Tex., area, succeeds Parker as assistant superintendent at Wichita Falls.

M. C. Parrish, Jr., president and manager of Hondo Drilling Co., Artesia, N. M., has moved his company headquarters to Midland, Tex. Also transferring from Artesia is **Bruce Connally,** drilling superintendent, who is now headquartered at Hobbs, N. M.

Karl E. Nichols, with Skelly Oil Co. for more than 20 years, has resigned and will enter the independent oil-producing business in Midland, Tex.

Walter G. Sterling, president of the Sterling Oil & Refining Co., Houston, has been appointed to the board of trustees of the Hermann Hospital Estate, Houston.

Charles M. Barnes, Danciger Oil & Refining Co., has been named district landman for the West Texas-Southeast New Mexico area, and will be headquartered in Midland. He formerly was an independent oil operator.

Roy Dickinson, geologist for Lion Oil Co. at El Dorado, Ark., has been transferred to Snyder, Tex., in a similar capacity.

O. Mingus, chairman of the management-staff committee, Lago Oil & Transport Co., Ltd., has been named general manager of the company, and **F. E. Griffin,** recently elected a member of the board of directors, has been appointed to the new position of general superintendent, and to the executive committee. **J. J. Horigan** continues as company president and chairman of the executive committee, and **D. L. Hussey,** who is in Aruba on a 2-year rotational loan assignment from the Bayway, N. J., refinery, has been appointed process superintendent replacing Griffin for that period.

Joseph H. Mader has been named assistant director of the American Petroleum Institute's department of information, New York City. He formerly served as district representative for the Oil Industry Information Committee. **Jack McKenzie** has been named assistant supervisor of field operations for the A.P.I. department.

H. W. Imholz, consulting geologist, Ranger, Tex., is now located at Abilene, Tex.

H. W. Addington, reservoir engineer at New Orleans for the California Co., has been transferred to Denver as assistant division engineer.

George Potter, Jr., assistant to the chief scout for Tide Water Associated Oil Co.'s Houston office, has been transferred as scout to Midland, Tex. Other changes include: **Leroy D. Lott,** associate engineer at Kilgore, Tex., named field engineer at Conroe, Tex.; **Ernest W. Childers,** district petroleum engineer at Victoria, Tex., transferred to Houston as drilling and mud engineer; **Thomas E. Covington,** associate engineer at Venice, La., transferred to Victoria, Tex., as field engineer; and **Herman E. Wendt,** engineer trainee at Hobbs, N. M., named associate engineer at Midland.

William R. Mais, Shell Oil Co., Houston, has been transferred to Oklahoma City as geologist.

I. A. Parmer, division superintendent for Coronado Oil Co. at Lefors, Tex., has been transferred to the company's Oklahoma City offices.

Servan G. Cantacuzene, research engineer, has been placed in charge of the Paris, France, office of Southwest Research Institute. Cantacuzene formerly was research and consulting engineer for several French and Romanian oil companies.

Tom Rives, tool pusher at Seminole, Tex., for Durham Drilling Co., Inc., is now located in that capacity in the Crane, Tex., area.

Ivan Otstot, independent oil operator, Denver, has transferred to Colorado Springs, Colo.

H. L. Scott, independent petroleum geologist, Huntsville, Ark., is now working in the Claremore, Okla., area.

C. C. Lawrence, seismic party chief for Amerada Petroleum Corp. at Oxnard, Calif., has been transferred in a similar capacity to the Wasco, Calif., area.

William A. Hutsell, superintendent of Humble Oil & Refining Co.'s Pickton, Tex., gasoline plant, has been transferred to Monroe City, Tex., as superintendent of the company's Anahuac plant.

Clyde P. Greber, geologist, has been elected president of Investors Royalty Co., Inc., Tulsa, replacing the late Benjamin Mossman. He formerly served as vice president of the company.

Joe N. Parke, geologist, American Republics Corp., Shreveport, has been transferred to the Lafayette office. Parke has been replaced in the Shreveport office by **Stewart Saye.**

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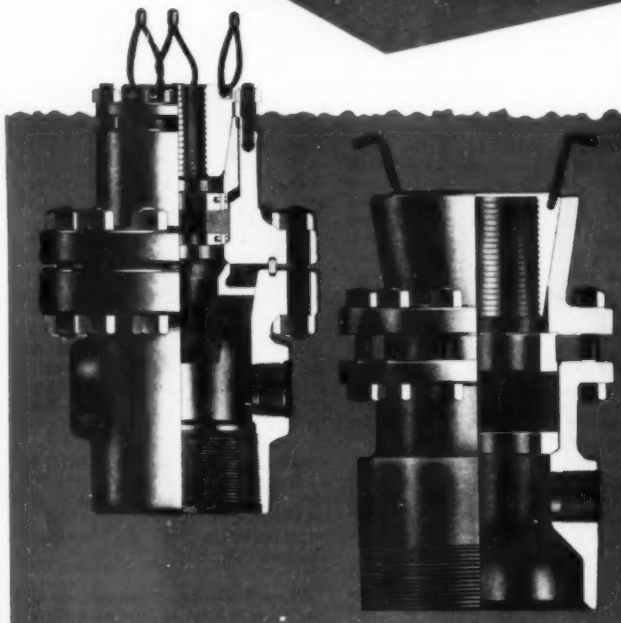

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who recently joined the company. **Fred W. Howells** and **Edward W. Anderson,** both geologists, recently joined American Republics in the Houston office.

Wayne Wilson, geologist, Houston, has joined **John W. Mecom,** Houston independent oil operator. Wilson was formerly with American Republics Corp.

Courtney E. Cook, gas-lift engineer for Republic Natural Gas Co. at Refugio, Tex., has been transferred to Corpus Christi as engineer.

Dr. George H. Fancher, Austin, Tex., has been appointed director of the joint research program on secondary recovery which is being carried on cooperatively by the University of Texas, Texas A. & M. College, and the Texas Railroad Commission.

L. A. Scholl, Jr., has been appointed geophysical consultant on the general manager's staff, The Texas Co.'s producing department, Houston, and **Roy L. Lay** has been named manager of the geophysical division. Scholl, a graduate of Carnegie Institute of Technology, started with the old Producers Oil Co., Texaco subsidiary, as a geologist. He was appointed division geologist in Tulsa in 1918, and in

L. A. SCHOLL

ROY L. LAY

1920 was named chief geologist at Houston. After spending some time in Venezuela, Scholl was named chief of the geophysical division, and in 1945 was appointed manager. Lay, a graduate of Rice Institute, Houston, joined the company in 1932 as a geophysical party chief. He was made supervisor of field crews in 1937 and in 1938 went to Egypt. He was named assistant division manager in 1945.

N. P. Isenberger, vice president of American Independent Oil Co., San Francisco, has resigned and returned to Phillips Petroleum Co., from which he has been on loan. Before going with American Independent Isenberger was director of exploration for the foreign department of Phillips and served with Phillips Venezuelan Oil Co. in an advisory capacity. He is a graduate of Kansas University.

Leon Province, district production superintendent for Ohio Oil Co. at Grand Rapids, Mich., has been transferred to Reed City, Mich. Other changes include: **R. L. Fillner,** district manager for Michigan, transferred from Grand Rapids to Terre Haute, Ind.; **Gordon Pringle,** district geologist, moved from Grand Rapids to Terre Haute; and **George Thomas,** geologist at Columbus, Ohio, transferred to Grand Rapids replacing Pringle.

John A. Diodene, petroleum engineer in the Darrow district for Humble Oil & Refining Co., has been transferred to the Louisiana division as petroleum engineer. Other changes include: **D. E. Tousley,** civil engineer, transferred from the Avery Island district to the Louisiana division as senior civil engineer; **Andrew M. Gruy,** civil engineer, Gulf Coast division, transferred to the Louisiana division as senior civil engineer; **R. L. Carroll,** petroleum engineer at Avery Island, transferred to the Potash district in the same capacity; **J. W. Workman,** formerly gas-plant superintendent of the Anahuak, La., plant, transferred to the Katy gas cycling plant as assistant superintendent; **W. R. Mathyer,** head cycling plant operator at Katy, named compressor plant foreman at Lovell Lake, and **Narvin B. Frickman,** assistant district engineer in the Bayou Sale district, Louisiana division, transferred to the Avoka district, North Texas division, as assistant petroleum engineer.

Robert V. West, Jr., has been transferred from Midland, Tex., to San Antonio, and named assistant to the presidents of Upton and Santa Rosa Gas Products companies. The two companies are interests of Slick-Urschel, Inc.

Walter F. Pfennig, seismologist at Mount Pleasant, Tex., for Cities Service Oil Co., has been transferred to Raymondville, Tex., as party chief of a seismograph crew.

Ruthven W. Pike, who has had 25 years' experience in foreign oil exploration, has been appointed senior geologist of Conorado Petroleum Corp. He has been with Standard Oil Co. (N. J.) or affiliated companies, and has served as senior geologist or party chief in more than 15 countries in the Eastern Hemisphere and Latin America.

Rawleigh Warner, Jr., secretary of Continental Oil Co., has been elected treasurer and assistant secretary of Conorado Petroleum Corp. At its recent meeting, the Conorado board also elected **Miss Bettye M. Bohanon** as secretary and assistant treasurer. Conorado is the foreign exploration subsidiary jointly owned by Amerada Petroleum Corp., Ohio Oil Co., and Continental and headed by Arthur A. Curtice. Miss Bohanon has been with Conorado since its organization about a year ago.

Christian F. Dohm, former head of the exploration department of Tropical Oil Co. in Colombia, has been elected vice president in charge of exploration of Conorado Petroleum Corp. Dohm was educated at Louisiana State University at Baton Rouge where he received a B.S. and M.S. in geology. In 1937 he joined Standard Oil Co. of Venezuela, and after 3 years service with this company, the parent Standard Oil Co. (N. J.) organization sent him to the Dominican Republic. After 3 years he was transferred to Cuba where he remained until February 1946 when he succeeded **Walter K. Link** as head of Jersey Standard's northern exploration division. Later, Dohm was transferred to Colombia as Tropical's chief geologist, and in 1947 he was made head of the Tropical exploration department, a position he resigned to join Conorado.

C. F. DOHM

John Shonk, production superintendent at West Branch, Mich., for Ohio Oil Co., has been transferred to Robinson, Ill., as assistant district superintendent.

Harold A. Lacik, petroleum engineer for Ohio Oil Co. at Rawlins, Wyo., has been moved in the same capacity to the McFadden, Wyo., area.

Robert H. Stewart, Hollis, N. Y., has joined the headquarters staff of American Petroleum Institute, New York City, as administrative assistant to the president. He formerly was assistant to the vice president of California Texas Oil Co., Ltd.

Olen Lane, regional land superintendent, Pacific Coast region, Continental Oil Co., has been appointed to the newly created position of regional manager of exploration, with headquarters in Los Angeles. Other changes in the Pacific Coast area include: **Lawrence E. Graham,** land man, named regional land superintendent; **R. G. TenEyck,** assistant division geologist at Los Angeles, named assistant to the chief geologist at

PERSONALS

Houston; and **J. B. Anderson,** geologist, named assistant division geologist, Los Angeles.

H. A. Grimes, veteran of 28 years in the oil industry, has been appointed a member of the management committee in Venezuela of Creole Petroleum Corp. He went to Venezuela in 1922 as field engineer with Creole, and from 1922 until 1943, while stationed there, received several appointments, including the position of manager of the eastern division of the company. He served as chief engineer of the division and also was materials department coordinator from 1938 to 1940. Transferring to the Talara oil field for International Petroleum Co. in Peru in 1944, Grimes was named general manager of that firm's operations in 1945. He held this position until October 1949.

Donald C. Stoll, group engineer, manufacturing department, Standard Oil Co. (Ohio), has been appointed chief process engineer at the company's Lima refinery, replacing **J. D. Stubbs,** who has been named operations-control assistant at Lima. Other changes include: **Ralph G. Atkinson,** group engineer, manufacturing department, appointed chief process engineer, a newly established post at the No. 2 refinery; and **Gerald E. King,** group chemist, named technical assistant to **Godfrey Ladd,** who is in charge of the new solvent lubricating plant at the Lima refinery. In the Canadian division, **Robert A. Bishop** has been named division geologist for western Canada.

C. V. Reynolds has been appointed drilling superintendent of the northern district for Standard Oil Co. of California, replacing **F. A. Heitmeyer** who was appointed general superintendent of the district. Other changes include: **H. C. Rector,** assistant drilling superintendent at Kettleman Hills, Calif., transferred in that capacity to Taft, Calif.; **V. L. Taylor,** field superintendent at Coalinga, Calif., moved to Kettleman Hills in that capacity; **M. F. Spurlock,** field superintendent at Greeley, transferred to Coalinga; **R. L. Brown,** field superintendent of the Bay district, transferred to Greeley; **B. W. Norton,** appointed field superintendent of the Bay district with headquarters at Rio Vista; and **G. W. Colberg,** appointed superintending engineer of the marine department.

E. N. Redden, vice president and general manager of Rinehart Oil News, has resigned. He joined the organization in 1936.

W. O. Allen, Jr. has opened offices in the Perrine Building in Oklahoma City as an independent consulting geologist.

R. C. Ward, formerly district manager for Superior Oil Co. in Evansville, Ind., and now in the company's Houston offices, has been elected a vice president of the firm.

W. S. Floyd, Shell Oil Co., has been appointed manager of purchasing at San Francisco. He has been with the company since 1929.

Paul Holleman, independent operator, Effingham, Ill., has moved his headquarters to Evansville, Ind.

SHIFTS

T. T. Nudson, superintendent, Pacific Western Oil Co., Newcastle to Upton, Wyo.; **Albert Boyce,** superintendent, Phillips Petroleum Co., Norman, Okla., to Louann, Ark.; **Charles B. Paine,** engineer, Pure Oil Co., Nowata to Madill, Okla.; **C. C. Pitts,** engineer, Kerr-McGee Oil Industries, Inc., Oklahoma City to Midland, Tex.

Mark Olson, engineer, Continental Oil Co., Rio Grande City, Tex., to Houston; **Duane A. Schmeeckle,** engineer, Shell Oil Co., New Orleans to Donaldsonville, La.; **Howard B. Masters,** superintendent, Skelly Oil Co., Denver to Adams City, Colo.; **R. H. Corbin,** superintendent, Mid-Continent Petroleum Corp., Prague to Bristow, Okla.; **Mahlon H. Bartz,** engineer, Phillips Petroleum Co., Bartlesville to Borger, Okla.; **C. L. Creager,** engineer, Shell Oil Co., Elk City, Okla., to Great Bend, Kans.; **Albert R. Greer,** engineer, Anderson-Prichard Oil Corp., Oklahoma City to Dallas, Tex.; **J. E. Huzarevich,** engineer, Stanolind Oil & Gas Co., Tulsa, Okla., to Lubbock, Tex.; **Robert G. Wilson,** engineer, The Texas Co., Electra to Snyder, Tex.; **Darrell S. Pierson,** engineer, The Texas Co., Roundup, Mont., to Denver, Colo.; **Todd C. Storer,** engineer, Stanolind Oil & Gas Co., Bishop to Refugio, Tex.

E. A. Robb, superintendent, Pioneer Drilling Co., Inc., Edgerton, Wyo., to Roosevelt, Utah; **L. C. Bodemann, Jr.,** engineer, British-American Oil Producing Co., Riverton, Wyo., to Seymour, Tex.; **B. S. Greensfelder,** engineer, Shell Development Co., Emeryville to Oakland, Calif.; **Don E. Evert,** engineer, Union Oil Co. of California, Whittier to Orcutt, Calif.

DEATHS

Charles W. Willever, Sr., 64, retired assistant manager of the products division in the New York offices of Esso Standard Oil Co., died March 19 in Catasauqua, Pa. He had been with the company 48 years.

Dr. Herbert M. Kaufmann, 80, chairman of the board of directors of Mutual Chemical Co. of America, died in New York City, March 20.

Sam S. Miller, 78, Tulsa, cofounder of the Taubman Supply Co., which later became Bethlehem Supply Co., died March 24. At the time of his death he was treasurer of the Francis Oil Co.

Edward Earl Putnam, 59, Tulsa, founder of the former Western Improvements Co., an oil-field supply firm, and formerly with Skelly Oil Co., died in Rochester, Minn., March 26.

Charles Jacobsen, 63, district production superintendent for Barnsdall Oil Co. at Victoria, Tex., died in San Antonio March 27. With Barnsdall since 1912, Jacobsen was well known in Mid-Continent oil circles, having pioneered development in the Seminole and Osage areas of Oklahoma.

Edward Morris Smith, organizer of Emsco Steel Products Co. and Emsco Tool Co. of Los Angeles, which were later merged as the Emsco Derrick & Equipment Co., died in Arcadia, Calif., March 17. At the time of his death he was president of Globe Oil Tools Co., Los Nietos, Calif.

Peter B. Kievit, 61, Glen Rock, N. J., chief auditor, eastern division, Tide Water Associated Oil Co., died March 27.

John A. Medvec, 61, retired inspector at the Bayway, (N. J.) refinery of Esso Standard Oil Co., died March 20 in Elizabeth, N. J.

Benjamin Mossman, president of Investors Royalty Co., Inc., Tulsa, died recently.

Charles G. Williams, 72, Tulsa, retired oil operator, died March 24.

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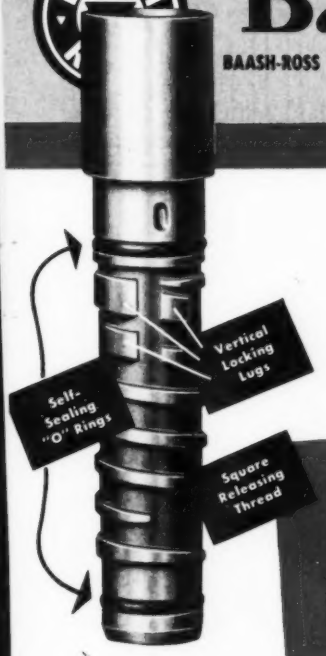

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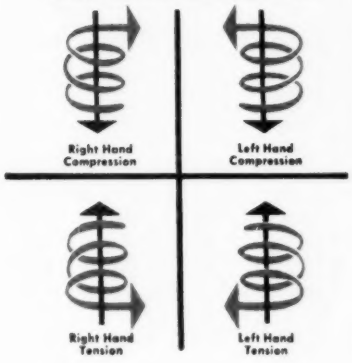
A simple, positive way to REMOVE STUCK TUBING STRINGS FROM YOUR PRODUCING WELLS

BAASH-ROSS PRODUCTION SAFETY JOINTS

4 TYPES TO MEET EVERY PRODUCTION REQUIREMENT



Why run the risk of costly salvage operations every time stuck packers, sanding conditions or similar difficulties jeopardize recovery of your tubing string, when it costs so little to insure recovery by using Baash-Ross Production Safety Joints?

A Baash-Ross Production Safety Joint placed in your tubing string provides a positive means of freeing the string at the point where the Safety Joint is installed, thus permitting important savings to be made in production operations. For example . . .

- **Where production packers are used, a Safety Joint should be installed above the packer to permit positive and complete release of the tubing string should the packer become stuck.**
- **Where sanding conditions exist, one or more Baash-Ross Production Safety Joints should be installed in the tubing string to permit selective release and maximum recovery.**
- **Where it may be desirable to change production methods in a well, a Baash-Ross Production Safety Joint should be installed in the tubing string to permit such changes to be made quickly and easily without disturbing the packer.**

Baash-Ross Production Safety Joints are simple in design, positive in operation and low in cost. They are provided with a unique locking lug that permits heavy rotational loads to be transmitted through the Joint without loosening it—yet disengagement can be quickly made whenever desired by merely following a simple sequence of operations. A choice of *four* different releasing actions is available—either *left* or *right* hand rotation, combined with either *raising* or *lowering* the production string—thus providing the exact releasing action best suited to each production hook-up.

LEAK-PROOF SEAL . . . FULL OPENING PASSAGE

Note in the illustration how the Baash-Ross Production Safety Joint is packed off top and bottom with self-sealing "O" rings to permit circulation through the Joint without leakage. Also, the Joint is full-opening so that tools and accessory equipment can be passed without difficulty. In fact, the Joint has the same internal and external dimensions as the production string itself. Anything that will pass through the tubing string will pass through the Joint . . . and the Joint itself will pass through anything the tubing couplings will pass through—an important consideration when used with certain types of completions.

A Size For Every Production Need

Baash-Ross Production Safety Joints are made of heat-treated alloy steel and are available in all four releasing actions in all sizes and types of API Tubing. So no matter what the nature of your particular production operations, you can protect against costly recovery or conversion operations by placing one of these efficient Joints on every tubing string.

QUICK POSITIVE RELEASE

Here's how the Baash-Ross Production Safety Joint operates to protect your tubing strings. The Joint consists essentially of a box and pin releasing thread (either right or left hand, as ordered) that is packed off top and bottom with self-sealing "O" rings. In the upper portion of the pin thread, two vertical lugs are machined into the body, and these lugs mate with a corresponding lug machined into the box portion.

The releasing threads are cut with a loose fit—that is, when the Joint is made up, the two portions can move a short distance longitudinally with respect to one another without affecting the vertical alignment of the Joint. This movement permits the mating lugs to lock and unlock as one portion of the Joint is moved with respect to the other portion—and the design of the lugs determines whether the Joint unlocks in tension or in compression. A shear pin is also provided that permits longitudinal movement of the Joint, but prevents premature rotational release.

Basically, the releasing action consists of first unlocking the lugs by lowering (or raising) the string—then rotating the string in the proper releasing direction (either right or left) to sever the shear pin and unscrew the Joint. Only by first moving the string in the proper vertical direction, then rotating it in the correct releasing direction, can the Joint be disengaged—and by properly selecting the releasing action, other tools below can be set and released without risk of disengaging the Joint.

PLATFORMING

Approaches the ideal solution for *Reforming* low-octane and straightrun gasolines

by Dr. Vladimir Haensel

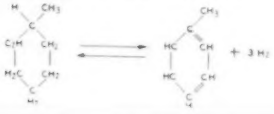
Introduction

There are tremendous quantities of straightrun and natural-gasoline stocks which are becoming less and less marketable because of their low octane number.*

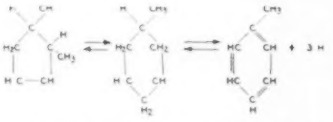
Over the past years, we have found that the Platforming operation approaches very closely to the ideal solution for the reforming of these low-octane straightrun and natural gasolines. These functions of the catalyst in carrying out the desired reactions under conditions wherein wasteful side reactions are virtually eliminated have been realized in the laboratory, pilot plant, and commercial operation.

Chemical Reactions Involved in Platforming

There are three major reactions which occur in Platforming of a straightrun gasoline. The first of these is the dehydrogenation of naphthenic hydrocarbons to the corresponding aromatic hydrocarbons. This is illustrated by the following:

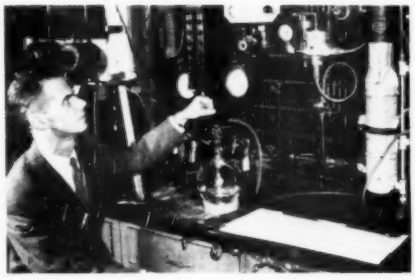


wherein methylcyclohexane is converted to toluene and hydrogen. As is well known, straightrun gasoline contains a substantial amount of naphthenic hydrocarbons, of both the six-membered ring type and the five-membered ring type, and in the latter structure the dehydrogenation reaction is preceded by the isomerization reaction:



Under Platforming conditions the reactions of dehydrogenation of naphthenic hydrocarbons are very rapid

The Author



Vladimir Haensel has been coordinator of cracking research division of Universal Oil Products Co. since August 1945. He received his B.S. from Northwestern University in 1935, and M.S. from Massachusetts Institute of Technology in 1937. He joined U.O.P. in 1939; later helped to set up the Ipatieff High-Pressure Laboratory at Northwestern University, and received his Ph.D. from that institution in 1941, then returned to Universal.

Paper presented at annual meeting Western Petroleum Refiners Association, San Antonio, March 27-29.

Background of Platforming Development

*The realization of this situation of surplus low-octane material is not a sudden one, and the petroleum industry has been extremely active in attempting to convert these stocks into a suitable motor fuel. A tremendous amount of work has been done on noncatalytic processes such as thermal reforming and on catalytic processes such as hydroforming and desulfurization. Although the thermal and catalytic processes have come into commercial application, they do not provide an ultimate solution for the production of high yields of high-octane motor fuel from the straightrun and natural-gasoline stocks.

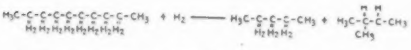
Over the years of research on the conversion of these materials into more valuable products, the fundamental ideas were formulated by Universal Oil Products Co. which outlined the ultimate goal and ways in which such a goal could be achieved. First of all, it was realized that the ultimate process should be a catalytic one, free, as much as possible, from the undesirable thermal effects. The reason for this is that thermal treatment or a high-temperature, high-pressure treatment in the absence of catalysts gives rise to reactions which are difficult to control and as a result a large portion of the liquid charge is converted into waste gas. Thus, it became apparent that in order to achieve this goal, one had to operate using a catalyst at conditions under which thermal reactions are essentially absent.

Next, it was realized that such a catalytic process had to be made up of a number of chemical reactions since gasolines contain different hydrocarbon classes, each class requiring a different chemical reaction so that the members of this class can most efficiently be converted into more valuable components. Furthermore, it became apparent that the rearrangement and conversion of the charging stock had to be extensive because there is no simple method of separating the product of the reaction from the charging stock.

Having established the fundamental principles of such an idealized process, it was necessary to find a suitable catalyst which could perform all these functions and at the same time have one other extremely important feature. This particular feature is the elimination of the need for catalyst regeneration, since regeneration is a costly and complicated operation. One merely has to consider the fact that no charging stock is processed over the catalyst during regeneration to realize that the efficiency of a nonregenerative operation and its inherent simplicity provides a practical solution for a refiner who cannot afford a large investment in a plant that remains nonproductive for a good share of the time.

and these reactions contribute substantially to the octane gain and heat of combustion of the gasoline. They are also highly endothermic, that is, they require a high heat input and they result in some volumetric shrinkage since the aromatic product is denser than the parent naphthene. Thus, for example, if the charge consisted of pure methylcyclohexane and if it were all converted to toluene, the theoretical yield of toluene would amount to 83.3 per cent by volume of the charge with an octane-number increase of about 50 units. The naphthenic content of straightrun gasolines varies considerably, but, assuming an average value of about 40 per cent, the maximum volumetric yield due to dehydrogenation to aromatics would be about 93 per cent assuming complete conversion and no other reactions.

Another important reaction in Platforming is the opposite of dehydrogenation from the standpoint of yield and heat of reaction. This is the reaction of hydrocracking wherein a high-molecular-weight hydrocarbon is decomposed into lower-molecular-weight compounds. This is not the reaction of thermal cracking, where a paraffin is cracked indiscriminately along the hydrocarbon chain, nor is it the reaction of catalytic cracking where the product consists of lower-boiling paraffins and olefins. It can be considered as a simultaneous cracking-isomerization-hydrogenation reaction, as shown by the following:



This reaction, as can be seen, produces isopentane and normal pentane from decane. In actual operation, the break in the molecule occurs not only in the middle, but also to the right and left of the center, so that butane and hexane, as well as propane and heptane, are formed also. Assuming for the time being that two pentane molecules are formed, the volumetric yields of such a reaction at 100 per cent conversion is 118 per cent along with an octane number gain of more than 100 units. As stated before, there is a small loss to propane and lower hydrocarbons with the result that only a part of that high gain in volume and octane number can be realized.

It is, therefore, apparent that the hydrocracking reaction balances the dehydrogenation reaction in that it provides for a lower density product and absorbs a part of the hydrogen which is liberated in the dehydrogenation reaction. The reaction is also exothermic and, therefore, provides some of the heat of reaction required for the dehydrogenation step. The hydrocracking reaction is less rapid than the dehydrogenation reaction as will appear from data to be presented in the next section.

The third major reaction in Platforming is isomerization. This reaction was mentioned earlier, when it was stated that five-membered ring naphthenes undergo isomerization to six-membered ring naphthenes prior to the conversion into aromatics. Likewise, the isomerization of paraffins proceeds readily at Platforming conditions. In the case of normal heptane, this reaction is faster than hydrocracking as shown by Fig. 1 in

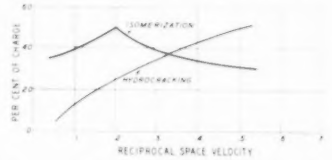


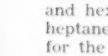
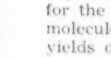
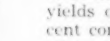
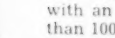
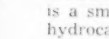
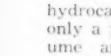
Fig. 1—Treatment of normal heptane with Platforming catalyst in the presence of hydrogen.

which the extent of isomerization and that of hydrocracking are plotted against contact time measured as reciprocal space velocity. It will be observed that as the space velocity is reduced the extent of isomerization reaches a maximum value at a space velocity of about 5.

At lower space velocities the hydrocracking of the isomerized compounds reduces the net yield. The composition of the isomerized product is of interest in that nearly every possible heptane isomer is produced. Thus, at a space velocity of six, the composition of the heptane fraction exclusive of the normal heptane charged is:

TABLE 1

Treatment of Normal Heptane With Platforming Catalyst in the Presence of Hydrogen

Compound	% in C_7 cut, excl. of n-C_7H_{16}
	46.2
	30.6
	10.9
	4.7
	4.5
	3.1

The hydrocracking reaction which accompanies the isomerization reaction of heptane gives, as expected, propane and butane as the major products, the isobutane-normal butane ratio in the butane fraction being about one. Both higher and lower paraffins also undergo extensive isomerization.

In addition to the three major reactions that occur in Platforming, there are other important reactions. These include dehydrocyclization, wherein paraffins are converted directly to aromatics, and desulfurization, wherein virtually all of the combined sulfur is converted to hydrogen sulfide.

The question naturally arises as to how we balance the extent of the various reactions that take place in Platforming in order to attain the optimum yield octane relationship. This is accomplished primarily by proper selection and preparation of catalyst. Secondarily, the operating conditions are adjusted to give the desired product distribution.

It should be emphasized that Platforming is unique among reforming processes from the standpoint of low methane production. In a process of this kind, methane production is undesirable from the standpoint of severe loss of liquid product, high exothermicity of the reaction which forms methane, and high hydrogen consumption. The extremely low methane production is beneficial on the basis of high liquid yield and control of the reaction at all times. For example, with other catalysts, a high-pressure condition leads to excessive methane formation and an exothermic condition is reached which is difficult to control.

With the Platforming catalyst, on the other hand, a high-pressure operation gives only a small amount of methane and as the temperature is increased the selective hydrocracking reaction is quenched by the dehydrogenation reaction. Thus, there is no tendency to develop runaway temperatures in the operation of the Platforming process. In addition it should be pointed out that another undesirable reaction, characteristic of some reforming processes, and involving the formation of high-molecular-weight compounds, is essentially eliminated in Platforming. Therefore, platformates do not require rerunning.

Operating Variables

There are four major operating variables in Platforming. These are temperature; space velocity, which represents barrels of charge per hour divided by barrels of catalyst; pressure; and hydrogen recycle rate. The study of these variables as well as that of catalyst composition has been carried out in 11 laboratory and pilot-plant units, ranging in throughput from 1 gal. to 4 bbl. per day.

Table 2 shows the results obtained in processing an initial boiling point to 350 F. boiling-range straightrun stock from mixed paraffinic and naphthenic crudes.

TABLE 2—EFFECT OF TEMPERATURE

Run—	Charge	1	2	3	4
Average cat. temp., F.		813	843	873	903
Yield of C_5+, liq. vol. per cent of chg.	100.0	98.0	96.8	95.0	91.6
R.v.p.	5.5	6.0	6.7	8.3	11.4
Octane numbers:					
F-1 clear	60.8	67.5	74	80.5	89
F-1 + 3 cc. TEL	80.2	85	88	92.5	98.5
F-2 clear	60.7	65	70	75.5	82
F-2 + 3 cc. TEL	80.0	82	85	88	91.5
Per cent aromatics in product	9	19	27	35	43
Per cent over at 212° F.	31	34	36	41	46
Hydrogen production, cu. ft. per bbl.		166	318	420	466

TABLE 3—EFFECT OF OPERATING PRESSURE

Run No.—	Charge	1	2	3
Pressure, psig.		500	700	900
Yields, volume per cent of charge:				
C_5+ platformate		92.6	92.9	93.2
C_5+ platformate		86.5	86.1	83.5
10-lb. R.v.p. platformate*		97.3	96.4	92.4
Octane No. of 10-lb. R.v.p. platformate:				
F-1 clear	30.6	85.1	84.1	84.8
F-1 + 3 cc. TEL	52.8	95.2	94.3	94.9
Per cent aromatics, based on charge	7.1	53.9	47.9	45.4
Per cent over at 212° F. + loss	0	12.7	18.9	22.7
Hydrogen production, cu. ft. per bbl.		685	433	287

*With outside butane 4.7 per cent at 500 psig. and 3.5 per cent at 700 psig.

The results shown indicate first of all that Platforming is a relatively low-temperature operation, and it is through the use of these mild conditions that the reaction remains a truly catalytic one, with no interference from undesirable thermal effects. The results also show the increase in the aromatization reaction as well as in hydrocracking with increased temperature at the operating conditions employed. Since both reactions contribute largely to the octane number gain it is not surprising that high octane numbers can be realized.

Effect of pressure as the major variable has been investigated and typical results are shown in Table 3. The charging stock consisted of a 247 -404° F. Mid-Continent straightrun naphtha. It will be observed that a low-pressure operation produced the most aromatics and the least amount of hydrocracking. At the highest operating pressure shown in the table, 900 psig., a larger part of the improvement in octane number is due to the hydrocracking reaction, since in this case the amount of hydrocracked material (as measured by per cent over at 212° F.) is almost twice that obtained at the lowest pressure.

The yield of butane is large at the highest pressure and in this particular case a small butane excess was obtained over that required for 10-lb. R.v.p. gasoline. Thus, it becomes apparent that by varying the operating pressure the Platforming operation can be carried out to produce either a more aromatic gasoline, which means more hydrogen production and a gasoline of lower volatility, or a more volatile product with a lower aromatic content and lower hydrogen production.

The range of pressure used in the Platforming operation is limited at the higher value by economic considerations as well as by temperature required to produce a given quality platformate. As the pressure is increased a limit is reached where thermal reactions may occur to such a degree that the yield-octane relationship deteriorates. The lower pressure limit is set by the decrease in the desired amount of hydrocracking as well as by possible carbonization of the catalyst.

The lack of carbon formation in the Platforming operation is due to the continuous prevention of formation of materials which lead to carbon, this prevention being carried out by hydrogen. If the partial pressure of hydrogen is maintained at a low value over prolonged periods of time there is a tendency for carbon formation to occur. Such a condition is prevented by providing a reasonable recycle gas rate thereby making the process a truly nonregenerative one.

It has been pointed out earlier that the dehydrogenation reaction is a relatively fast reaction while hydrocracking is considerably slower. A study of the effect of space velocity substantiates this statement. Tables 4 and 5 show the results obtained in processing a Mid-Continent naphtha at various conditions in which space velocity was a principal variable. It will be observed that, according to Table 4, a change in space velocity from about five to two increased the extent of hydrocracking threefold (as measured by per cent over at 212° F.), while the aromatization reaction, already very extensive at the highest space velocity, was affected only slightly. The results obtained with a somewhat more active catalyst are shown in Table 5 (in this series) where a higher octane number is reached at the same operating conditions.

TABLE 5

Effect of Space Velocity—Mid-Continent Naphtha 230°-395° F., Catalyst B

Test No.—	1	2	3
L.H.S.V.	2.0	3.0	4.0
C_5+ yield, vol. per cent	91.8	93.9	95.1
R.v.p.	12	10	6.9
F-1 clear	85	81	76
F-1 + 3 cc. TEL	95	93	90
Per cent aromatics in product	43	40.5	38
Per cent over at 212° F. + loss	32	25	17

The discussion of the effect of operating variables brings out also the flexibility of operation. As has been shown, we can vary the ratio of the reactions that occur in Platforming so that it is possible to obtain a number of volatility-octane relationships instead of one single relationship as is true in the case of thermal reforming. This flexibility of operation permits us to produce fuels that have a range of volatilities depending upon the over-all refinery economics.

Properties of the Platformate

At this point it is worth while to mention briefly some of the other properties of the platformate. These are sulfur contents, storage stability, and road performance.

TABLE 6

Source—	Sulfur			F-1
	Charge	Product	Per cent reduction	+ 3 cc. TEL
Michigan	0.045	0.0027	94	96
Gulf Coast	0.019	0.0023	88	93
Mid-Continent	0.040	0.0042	90	95
California (1)	0.102	0.0005	99	95
California (2)	0.14	0.0036	97	97

Table 6 shows the sulfur contents of the charging stocks and products and the corresponding leaded research octane numbers at a variety of severities.

The results shown in Table 6 indi-

TABLE 4—EFFECT OF SPACE VELOCITY—MID-CONTINENT NAPHTHA 230°-395° F., CATALYST A

Test No.—	Charge	1	2	3	4
L.H.S.V.		4.9	3.9	3.0	1.9
C_5+ yield, volume per cent		95.6	95.4	95.1	94.1
R.v.p.		4.5	5.2	6.4	6.9
F-1 clear	35	70	74	76.5	82
F-1 + 3 cc. TEL	59.5	86	89	90.5	93
Per cent aromatics in product	7	37	39	39.5	41
Per cent over at 212° F. + loss		8.3	13.5	16	24
H. production, cu. ft. per bbl.		495	475	470	520

cate that the sulfur removal from different stocks varies from 88 to 99 per cent, the initial sulfur content having no bearing on the extent of desulfurization. In other words, high-sulfur stocks are desulfurized to the same extent as low-sulfur stocks.

A number of storage stability tests have been made on platformates produced in pilot-plant operation. The following is a summary of the storage results using a platformate from a Michigan stock. The tests were made in vented bottles at 100° F. and no inhibitor was added.

TABLE 7—STORAGE STABILITY TESTS

	Start	2 mos.	4 mos.	6 mos.	9 mos.
Peroxide number	0.1	0.98	0.7	0.8	0.7
Induction period, min.	>1,020				
A.S.T.M. gum	0	1	0	0	1
Color, Saybolt	21	17	15	15	15

It will be observed that the platformate is very stable in storage. The addition of inhibitor is required only for the purpose of retaining tetraethyl lead in solution in the same manner as is necessary for straight-run gasoline. A slight drop in color has been observed to occur over the period of storage.

It is known that most gasolines have a road performance equivalent to a value between the research and the motor octane numbers. It has been found that platformates have a road-performance value which equals or substantially exceeds the research octane number, the mag-

(Continued on page 114)

Commercial Platforming at Old Dutch Refinery

by Dr. Vladimir Haensel

THIS portion of the W.P.R.A. San Antonio paper will describe briefly the progress of the first commercial Platforming unit at Old Dutch Refining Co., at Muskegon, Mich.

Fig. 1 is the simplified flow diagram of the Platforming unit, showing the prefractionator, the naphtha and recycle gas heaters, the three reactors, the separator, the compressors, and the stabilizer.

Unit in Continuous Operation

The unit was started on October 28, 1949, and has been in essentially continuous operation since that time, charging on the average 900-1,000 bbl. per stream day of a 180 -360 F. naphtha. More recently the throughput on the plant has been increased to about 1,500 bbl. a day. Performance of the plant has been highly satisfactory and, except for a few mechanical troubles which usually accompany the first tryout of any new equipment, the operation has proved itself to be exceedingly simple.

Operation has been conducted at 860 -890° F. average catalyst temperature and 700 psig. pressure.

It is interesting to note that the original plan was to operate to obtain a product with a leaded research octane number of 89-90. However, during the intervening period of construction, which required 139 days, the refiner was called upon to produce a considerably higher-octane product. As a result, the unit has been operating at somewhat different conditions to produce a leaded octane level of 93 with a yield of 94.5 per cent by volume.

At one time the unit was operated for a period of several weeks to produce a platformate having a leaded octane number of 95.8 with yield of 90 volume per cent.

The total gas production amounts to about 900,000 cu. ft. per day of which more than one-half is vented from the separator and contains 80-85 per cent hydrogen. The remaining gas is vented from the stabilizer overhead.

Table 1 gives a typical charge and product analysis from the Old Dutch operation.

One of the most significant and important features of the Old Dutch Platforming unit operation is the performance of the catalyst. Over the past 4 months of operation we have found no indication of any catalyst deactivation, and we expect the catalyst to remain in service for a long time.

TABLE 1—OLD DUTCH REFINING CO. PLATFORMING OPERATION

	Reactor Charge	Product	Reactor Charge	Product
Gravity, A.P.I.	56.9	57.6	60.0	62.1
IBP	203	88	176	86
10	220	123	192	129
50	255	240	239	215
90	300	319	302	306
E.p.	333	355	358	364
R.v.p.	0.8	13.6		10.0
F-1 O. N. clear	50	86.1	49	81.3
F-1 + 3 cc. TEL	0.045	0.0020		
Sulfur	0.0450	0.0020		

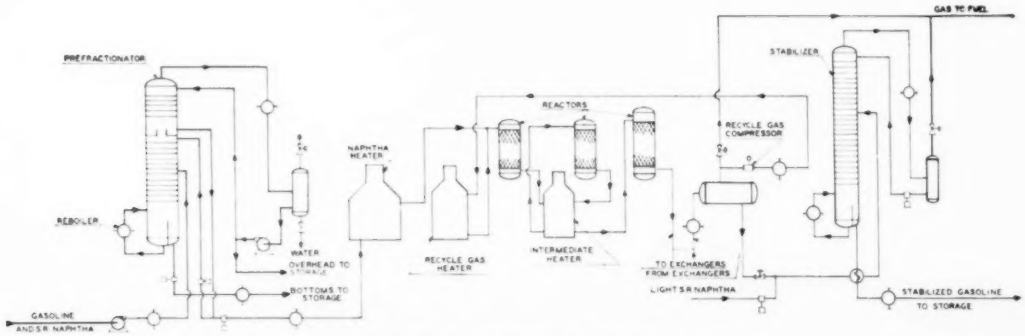


Fig. 1—Simplified flow diagram of Platforming unit.

Gas-Oil-Ratio Repair and Control

. . . in West Texas and New Mexico

by T. B. Lambert and R. M. Hippard

This paper presents a statistical summary of gas-oil-ratio repair operations and results in 24 fields located in the Permian basin of West Texas and New Mexico. A total of 503 repair jobs was analyzed and classified as to type, results, location, and cost of each job. Based on 144 successful jobs of all types in several fields, the average gas-oil ratio was reduced from 12,700 to 1,230 cu. ft. per barrel by remedial work. The authors are with Shell Oil Co. and located at Odessa, Tex., and Hobbs, N. M., respectively. Paper presented at A.P.I. Southwest District meeting, Dallas, March 8-10.

THE increasing value of natural gas and closer attention given by the regulatory bodies of Texas and New Mexico to gas-oil ratio behavior have lately focused special interest on the control and conservation of gas.

Texas.—The 16 Texas fields analyzed in this paper have a top limiting gas-oil ratio of 2,000 cu. ft. per barrel of oil, with the exception of North Cowden field with 3,000, Fuhrman-Mascho field with 3,500, and Seminole field with 2,500 cu. ft. per barrel. The top limiting ratio in Wasson field was reduced from 5,000 to 2,000 cu. ft. per barrel of oil in November 1947. The trend set by the Railroad Commission of Texas in top allowed gas-oil ratios appears to be downward.

New Mexico.—The eight fields in New Mexico considered in this report have varying gas-oil ratio limits as follows:

Field	Cu. ft. per bbl. of oil
Bowers	2,000
Cooper-Jal	(*)
Drinkard	2,000
Eunice and South Eunice	6,000
Hobbs	3,500
Monument	3,000
Paddock	2,000

(*)No limiting ratio

Similar to Texas, the trend of limiting gas-oil ratios, as set by the Conservation Commission of New Mexico, is downward. The newer fields, such as Bowers, Drinkard, and Paddock, have top allowed gas-oil ratios of 2,000 cu. ft. per barrel, or less than the older fields.

In both states, gas limits for individual wells are set and the penalized allowable is that amount of oil that can be produced with the gas assigned each well. For example, in Wasson field of Texas, a well with an allowable of 50 bbl. per day is allowed to produce 50 times 2,000 (top gas-oil ratio limit), or 100,000 cu. ft. per day. If the gas-oil ratio is determined to be 4,000 cu. ft. per barrel of oil, the well is assigned an allowable of 100,000 divided by 4,000, or 25 bbl. per day. The same method of penalizing wells with ratios in excess of the legal limit is used in New Mexico, with the exception that the gas limit for any individual well is determined by multiplying the top allowable in the field by the limiting gas-oil ratio.

Gas-oil ratios are normally reported once a year to the regulatory bodies of each state.

Wide Scope of Investigation

The 24 fields covered in this report are located in the Permian basin of West Texas and New Mexico. Essentially all of the work analyzed was performed on wells in limestones and dolomites of Permian age. Some of the reservoirs have an active water drive with a free gas cap and others are of a closed or depletion type, and usually had an original free gas cap.

This paper was prepared to investigate in as comprehensive a manner as possible the entire question of gas-oil-ratio repair and control in West Texas and New Mexico. Gas-oil-ratio repair questionnaires were sent to as many operators in West Texas and New Mexico as could be contacted. From these completed questionnaires, the comparative results of as many jobs as possible were examined.

The large amount of data examined gave a very complete cost picture of various types of repair jobs and of relative costs in different fields, as well as outlining some general guides or criteria that may aid in future gas-oil ratio repair work.

Criteria Used in Analyzing Data

From the data given on each questionnaire form having sufficient information, the jobs were classified as: (1) Success, (2) partial success, or (3) failure.

A job was rated a **success** if the gas-oil ratio was reduced below the unpenalized gas-oil ratio of the field for a period of at least 6 to 12 months. The varying period of time depended somewhat on the completeness of the follow-up production and gas-oil-ratio date. In 27 jobs which were accomplished recently and on which no follow-up data were available, some were rated successes based on the author's judgment.

A job was rated a **partial success** if the gas-oil ratio was appreciably reduced, but not below the legal limit of the field, for a period of at least 6 to 12 months. If the ratio was re-

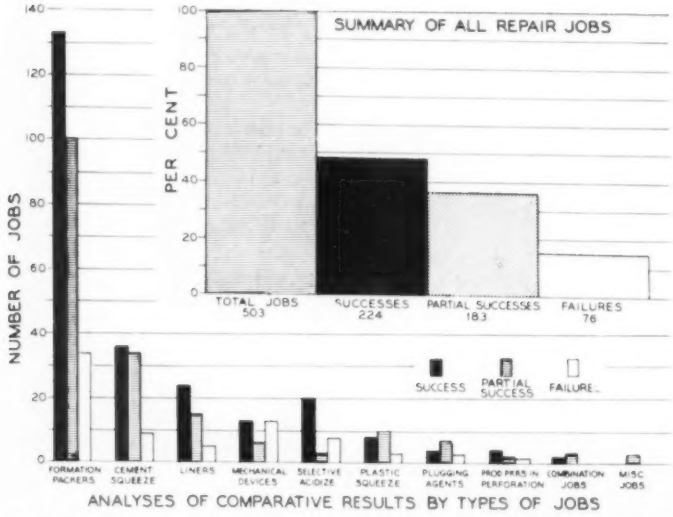


Fig. 1—Breakdown of data for well remedial work. Fig. 2 (inset)—Percentages of success.

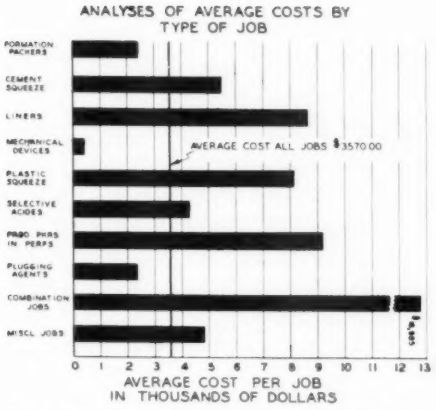

ANALYSES OF AVERAGE COSTS BY TYPE OF JOB
FORMATION PACKERS
CEMENT SQUEEZE
LINERS
MECHANICAL DEVICES
AVERAGE COST ALL JOBS $3570.00
PLASTIC SQUEEZE
SELECTIVE ACIDES
PROD PKRS IN PERFS
PLUGGING AGENTS
COMBINATION JOBS
MISCL JOBS
0 1 2 3 4 5 6 7 8 9 10 11 12 13
AVERAGE COST PER JOB IN THOUSANDS OF DOLLARS

Fig. 3—Average cost per well workover, by job method.

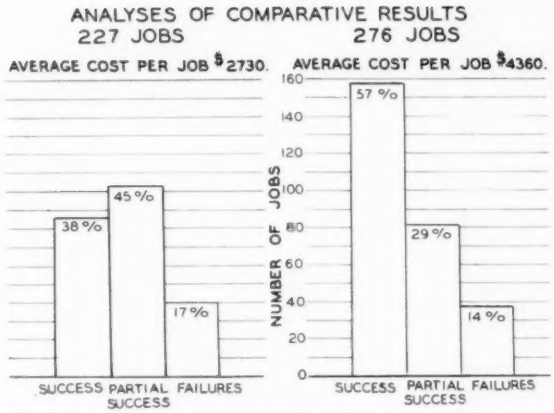


Fig. 5—Left, jobs prior to January 1, 1946; right, jobs after January 1, 1946.

duced initially to below the legal limit for a period of approximately 6 months, but gradually rose to the ratio prevailing before the work, the job was likewise rated a **partial success.**

A job was classified as a **failure** if no beneficial results were obtained.

The "life" or length of time that beneficial results were obtained from a job was considered to be the length of time required for the gas-oil ratio to exceed the top allowed ratio for the particular field. The life was not extended beyond the date of the last information, even though the gas-oil ratio at that time was still below the top allowed limit. The life was determined only for certain jobs rated **successes.**

The gas-oil ratio before a job was that listed by the operator filling out the questionnaire form. The average gas-oil ratio after the work was performed was the average ratio shown by the subsequent tests during the "life" after the job. The gas-oil ratio before and after workovers was determined only on a selected number of jobs which were rated **successes.**

The data were also divided into 10 main classifications or types of jobs, as follows:

1. **Formation packers.**—This classification included all types of formation packers used to exclude gas. In conjunction with some packers, sealing material was used and some wells were cleaned out, deepened, and acidized.

2. **Cement squeeze.**—This classification included all jobs in which the gas-bearing formation was squeezed with cement, no matter what the mechanics of the job were. In some cases cement was squeezed into casing perforations and in other cases into the open hole, after the oil-bearing formation had been protected by some type of plug. After the gas was shut off, later work consisted of perforating and/or acidizing.

3. **Liners.**—This classification included all workovers in which a liner was cemented through the gas-bearing formation. In some wells the liner was cemented below the gas-oil contact and an open-hole completion made below, while in others the liner was cemented at or near the bottom of the hole and perforated for completion. After the gas was shut off, acid was used in the majority of the wells.

4. **Mechanical devices.**—This classification covered all types of mechanical devices used for the purpose of reducing the gas-oil ratio of a well. It included such devices as time-cycle controllers or intermitters, pressure-controlled intermitters, flow valves, and bottom-hole chokes.

5. **Selective acidization.**—This type covered any job or device in which the oil zone was selectively acidized to the exclusion of the gas zone. Included were jobs in which the placement of acid was controlled by a packer, a pilot and two-pump method, or any of various other methods of controlling or placing acid. In addition, some of these wells were deepened, perforated, or shot with nitroglycerin.

6. **Plastic squeeze.**—This classification included all jobs in which plastic was squeezed or forced into a gas-bearing formation. Additional work performed on wells of this classification included cleaning out, deepening, and acidizing.

7. **Plugging agents.**—This classification included all jobs in which either a combination of sodium silicate and sulfuric acid or emulsified oil was forced into gas-bearing horizons to provide a permeability block. These types of plugging agents, as shown by the data analyzed were used prior to 1945. Acidization and shooting with nitroglycerin were used in conjunction with this type of job.

8. **Production packer in casing perforations.**—This type of job included all those jobs on wells which were producing through perforations and in which a production packer was set in or between the perforations for the purpose of excluding an upper gas-bearing formation.

9. **Combination type.**—This type of job covers a combination of two or more of any of the aforementioned classifications and was usually the result of a failure or partial failure of one type of repair job which necessitated the use of an additional method on the same workover.

10. **Miscellaneous type.**—This type includes cleanouts, deepening, and perforating which was not done in conjunction with any of the aforementioned types of work.

Statistical Results of Survey

A total of 503 questionnaires completed in usable form, covering 24 fields in West Texas and New Mexico, were received from operators.

(Continued on page 99)

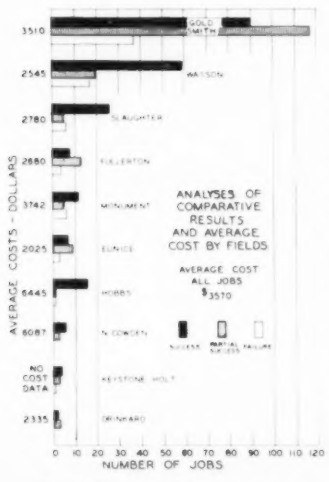


Fig. 4—Well workovers, by fields.

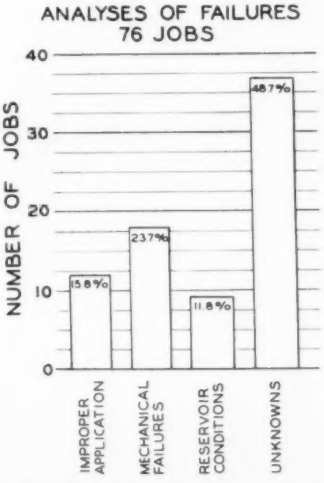


Fig. 6—Analyses of reasons for failures.

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Where increased gallonage depends on improved quality, depend on Platformate.

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LABORATORIES: RIVERSIDE, ILLINOIS

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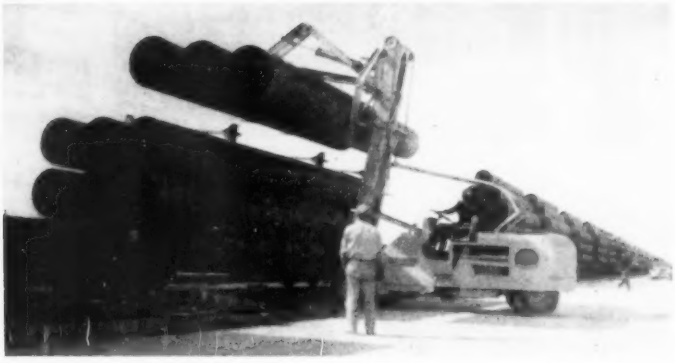
"Checking the sales figures of our branded outlets for a thirty-five day period this year against the same period in 1949, indicates a substantial increase in gallonage. New markets have been opened for a gasoline superior in anti-knock quality to the ordinarily accepted premium grade. New customers have been converted to regular customers . . . particularly the owners of new cars."

FORK LIFT TRUCKS



... new developments add greatly to the usefulness of this versatile equipment

Top—Lift truck loading a 90-ft. length at Barstow, Calif., for delivery to pipe line right-of-way. Above: Hydraulic arm has secured pipe on forks, and the fork-lift truck is ready to move off.

by D. H. Stormont
California District Editor

RECENT California developments of special equipment for fork-lift trucks have greatly added to the versatility of this lift and transport tool. Especially is this evident in pipe-line construction work and in the handling of large-diameter pipe.

In this field there has been a growing problem of steadily increasing handling costs. The engineering ingenuity of Bechtel Corp., San Francisco; Pacific Pipeline Construction Co., Montebello, Calif.; and Gerlinger Carrier Co., Dallas, Ore., has provided some interesting answers to this problem through adapting fork-lift trucks to pipe-handling work.

At the double-ending plant of Bechtel-Price-Coyne at Barstow, Calif., (Super-Inch line*) Gerlinger fork-lift trucks now unload 34-in. pipe from cars at railhead in just a bit over one-third former time; carry three lengths of pipe per load from cars to plant; and load double-ended pipe in 60 or 90-ft. lengths for transport to the right-of-way.

To speed the unloading of flat cars, two devices are used. For unloading the three nested lengths on top of the load, the A-frame attachment with spreader is used. Spreader has self-setting and gravity-locking hooks. These enable the lift-truck operator to pick off pipe lengths without other help.

The remaining nine lengths on the car are removed three at a time through the aid of another device. This is a hydraulically operated arm which moves vertically and horizontally. As remaining pipe on car is separated by stickers, the forks of

*For detailed discussion of other engineering features of this pipe line, see The Oil and Gas Journal, February 2, 1950, pages 50-52.

Three steps in loading the third length of 30-in. pipe onto the forks from nested pile. Left: Here wedge has separated the pipe. Center: Backward movement of wedge pushes pipe onto the forks. Right: Three lengths are now on the forks, held in place by the wedge. (Photos taken at Pacific Pipeline Construction Co. yard, Montebello, Calif.).

the truck can be run under the pipe. The operator then moves the arm into position as a support against the far length of pipe. This holds the pipe securely in position on the forks and permits easy transport.

The newest development along this line is the fork-lift truck recently delivered to Pacific Pipeline Construction Co. This is a specially equipped, 9-ton, standard Gerlinger truck. It is designed to pick up or pile pipe from or in nested position. It can handle three 30-ft. lengths of 34-in. diameter pipe.

The operation requires a much more rugged securing arm than that used at Barstow.

In operation, the truck is run up to a nested pile of pipe. The forks are set at the base of the first length adjacent to the pipe to be loaded. The arm is run forward as far as the back of the pipe length.

On the end of the arm is a pivoted knife with a 10° play. Once in position, a second hydraulic cylinder moves the arm and the knife downward. This motion stabs the knife between the lengths of nested pipe. A force of 50,000 lb. can be delivered by the vertical cylinder, thus realizing a thrust of 9,000 lb. or more on the vertical knife.

The descending knife separates the pipe. The horizontal cylinder then imparts a pull and a lifting force to the pipe lying against the face of the knife. This raises the pipe from its position of tangency sufficiently to lift it from the nest.

Once the length is clear of the pipe on which it had been resting, the vertical knife is moved toward the operator, thus pushing the pipe length onto the forks of the truck. A slight upward tilt of the forks prevents the pipe from rolling off.

This operation is repeated to load a second and third length. With the third length on the forks, the wedge is held against the pipe as a securing arm.

If pipe is to be piled, these movements take place in reverse order.

Once the forks are set in the desired position, it is not necessary for the operator or an assistant to check position of the arm in relation to the pipe. Marks set on the vertical lift guides for the particular diameter of pipe being handled, allow the operator to load or unload "blind." Forward position of the knife can be "seen" by the operator through a warning light that flashes when the knife is the desired distance beyond the end of the forks.

New Device Perfected for Lighting Pilot Light on Elevated Flare Stacks

by O. L. Clevenger* and W. A. McElhannon*

RECENTLY a distinctly different method of lighting and keeping lighted the pilot light on elevated flare stacks was developed and put in operation at the Baytown refinery of Humble Oil & Refining Co.

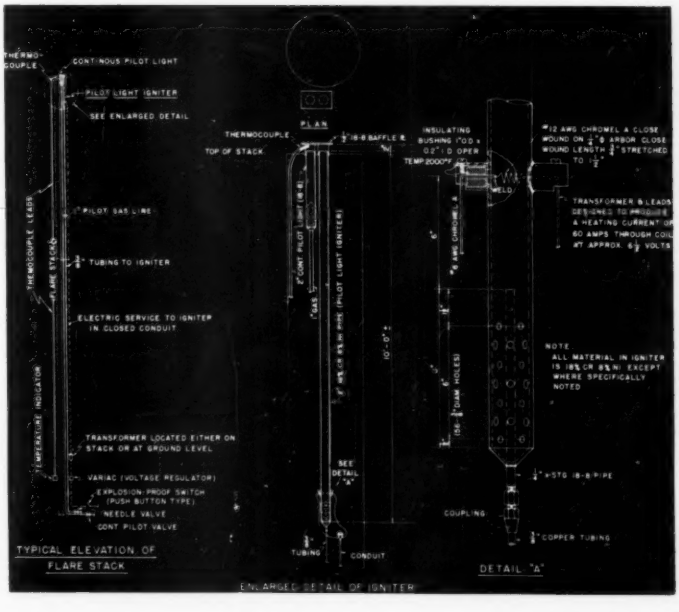
This method consists of a 1-in. continuous pilot gas line, running from the ground to the top of the stack, and a 2-in. pipe approximately 10 ft. long located adjacent the 1-in. pilot line at the top of the stack. The 2-in. line is perforated at its lower end and is connected at this end to a ⅜-in. copper tubing extending to a needle valve and a gas supply line at the base of the stack. Also inside the lower end of the 2-in. pipe is an electrical heating element with leads extending to a transformer and an explosion proof switch at the base of the stack.

To ignite the pilot, the switch is closed at the base of the stacks which energizes the heating element with a low voltage current. This current is so regulated that the element reaches a maximum temperature of approximately 1,800° F. in 20 seconds. When the element has become heated a small amount of natural gas is introduced into the lower end of the 2-in. pipe through the ⅜-in. tubing and is mixed with air which enters through the perforations. On contact with the heated element this combustible mixture is ignited and the flame travels through the 2-in. pipe to the top of the stack where it ignites gas coming from the continuous pilot. This method has been in continuous use for approximately 1½ years on stacks ranging in height from 200 to 300 ft.

Advantageous features of this igniter are: since no open flame or sparks are required at the base of the stacks, it is not necessary to obtain a gas test to see if a combustible mixture of hydrocarbons is present at the base of the stack before operating the ignition device; there is no danger of an explosion due to improper mixture of gas and air in the ignition line, as would be the case if a combustible mixture of air and gas were introduced at the base of the stack; and the heat source for ignition is a low-voltage heating element.

On clear days it is impossible to see if the pilot light at the top of the stack is burning. To overcome this difficulty a thermocouple has been placed at the top of all stacks with leads extending to temperature indicating instruments located at the base of the stacks or in the control houses serving the units in which the flare stacks are located.

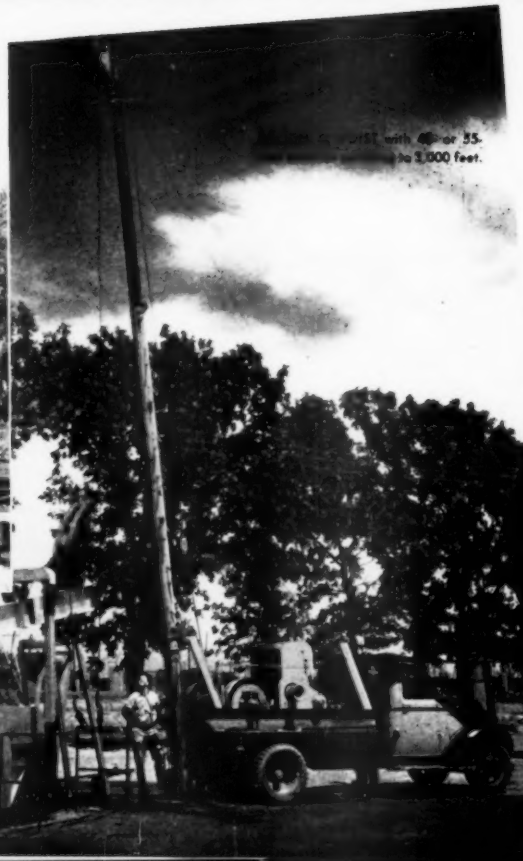
Further refinements could be added consisting of solenoid switches and valves that would automatically relight the pilot if it should be accidentally extinguished. Design and construction of this ignition device are covered by patent applications filed by Humble.


THERMO-COUPLE
CONTINUOUS PILOT LIGHT
PILOT LIGHT IGNITER
SEE ENLARGED DETAIL
PLAN
THERMOCOUPLE
TOP OF STACK
18-8 BAFFLE R
INSULATING BUSHING (OD x .02" I.D. OPER TEMP 2000°F)
#12 AWG CHROMEL A CLOSE WOUND ON ¼" D ARBOR CLOSE WOUND LENGTH 2" STRETCHED TO 3½"
WELD
TRANSFORMER 6 LEADS DESIGNED TO PRODUCE A HEATING CURRENT OF 60 AMPS THROUGH COIL AT APPROX. 6½ VOLTS
PILOT GAS LINE
THERMOCOUPLE LEADS
FLARE STACK
TUBING TO IGNITER
CONT PILOT LIGHT (1" IRON PIPE)
GAS
#8 AWG CHROMEL A
ELECTRIC SERVICE TO IGNITER IN CLOSED CONDUIT
2" IRON OR STEEL PIPE (PILOT LIGHT IGNITER)
10'-0"±
TEMPERATURE INDICATION
TRANSFORMER LOCATED EITHER ON STACK OR AT GROUND LEVEL
VARIAC (VOLTAGE REGULATOR)
EXPLOSION-PROOF SWITCH (PUSH BUTTON TYPE)
NEEDLE VALVE
CONT PILOT VALVE
SEE DETAIL "A"
#8 DIA HOLES
NOTE
ALL MATERIAL IN IGNITER IS 18% CR 8% NI EXCEPT WHERE SPECIFICALLY NOTED
2" STD 18-8 PIPE
COUPLING
¾" COPPER TUBING
TUBING
CONDUIT
TYPICAL ELEVATION OF FLARE STACK
DETAIL "A"
ENLARGED DETAIL OF IGNITER

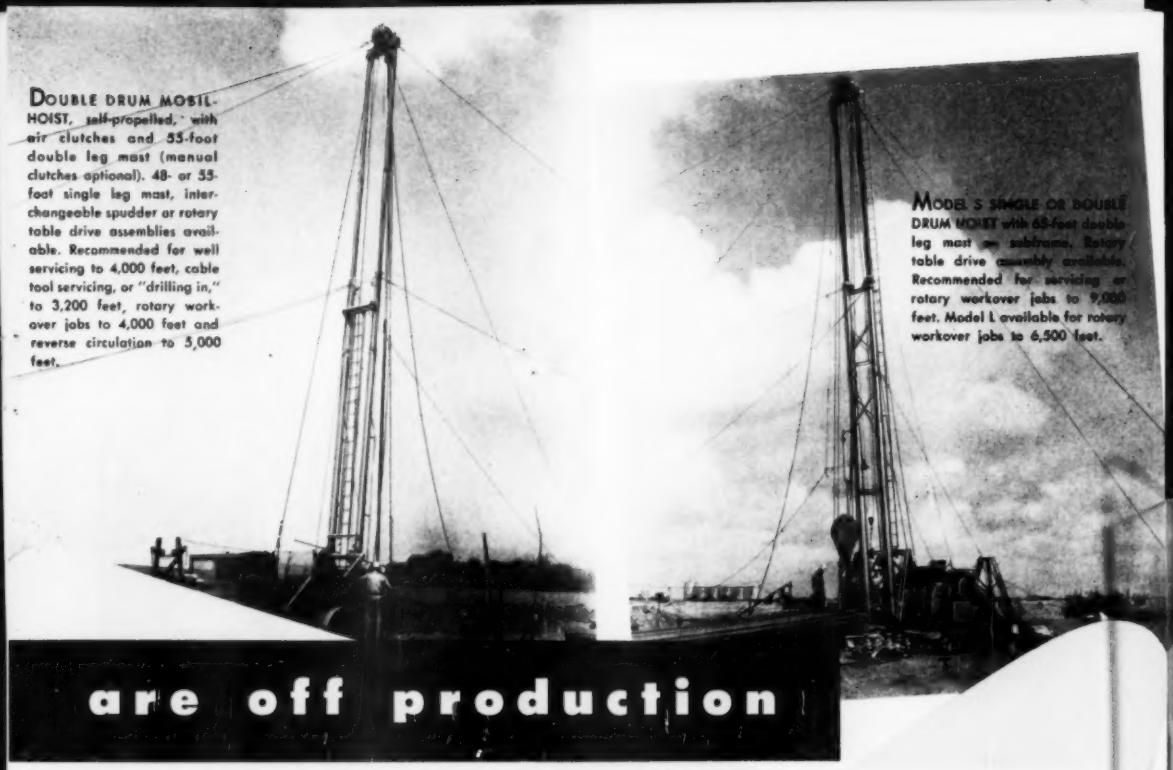
*Humble Oil & Refining Co., Baytown, Tex.

MODEL H or K single drum hoist with 48- or 55-foot single leg mast for servicing to 6,500 feet. Double leg mast is available.

Dollars go fast when wells



DOUBLE DRUM HOIST with spudder assembly and 65-foot mast. Models H, K and R are available with interchangeable cable tool and rotary table drive assemblies for cable tool or rotary workover from 2,500 to 10,000 feet, and well completion ("drilling in") from 1,500 to 7,500 feet.



DOUBLE DRUM MOBIL-HOIST, self-propelled, with air clutches and 55-foot double leg mast (manual clutches optional). 48- or 55-foot single leg mast, interchangeable spudder or rotary table drive assemblies available. Recommended for well servicing to 4,000 feet, cable tool servicing, or "drilling in," to 3,200 feet, rotary workover jobs to 4,000 feet and reverse circulation to 3,000 feet.

MODEL S SINGLE OR DOUBLE DRUM HOIST with 65-foot double leg mast on subframe. Rotary table drive assembly available. Recommended for servicing or rotary workover jobs to 9,000 feet. Model L available for rotary workover jobs to 6,500 feet.

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As a result of 24 years of continuous research and careful study of field requirements, "Cardwell" rigs are available with attachments for every type of field procedure . . . "drilling in" with cable tools, well deepening with rotary or cable tools, squeeze jobs, reverse circulation and drilling from grass roots with cable tools or rotary.

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ANSWERS TO *OUR* QUESTIONS ABOUT NO-OX-ID RUST PREVENTIVES

● Here are the high points of a discussion recently held between a Dearborn representative, who *asked* the questions and an executive engineer of a major gas line who supplied the *answers:*

Q. How long have you used NO-OX-ID? **A.** Ten years.

Q. Uninterruptedly? **A.** Yes.

Q. Have you ever been disappointed? **A.** Certainly not, the results have been good.

Q. Can you name a specific performance? **A.** Yes, 10 years without a leak or replacement with soil resistance at 750 to 1200 ohms per cubic centimeter.

Q. What protection did you use prior to NO-OX-ID and what was your experience? **A.** Another coating that gave us an average pipe life of two years.

Q. Comparatively speaking, have you found NO-OX-ID applications cost less? **A.** Yes, not only with maintenance crews but some contractors on "big inch" lines have bid an average of five cents per foot less.

This is typical of the regard of users for NO-OX-ID Rust Preventives in every pipe line service.

Consult with your Dearborn Engineer. There are versatile NO-OX-ID coating combinations for new or reconditioned lines . . . hot or cold application . . . for every climate and soil condition.

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NO – OX – ID
IRON + OX = RUST

THE ORIGINAL RUST PREVENTIVE

Freezing Plugs in High-Pressure Wells

. . . by means of "dry ice"

by I. A. Miller

USING dry ice to freeze a plug in a string of pipe has been undertaken only when other means of doing the job appeared impracticable or unsafe, and it is well to bear in mind that this unusual method is not just another routine operation, but actually is quite hazardous unless properly administered by experts who are thoroughly experienced in pressure control techniques.

It was in January 1946 that first experiments which led to the now generally accepted dry ice technique were conducted. Many experiments and tests followed over a considerable length of time before it was concluded that a plug could be frozen so tightly in a joint of pipe that no reasonable amount of pressure would move it or leak through it.

This article is a brief review of the comparatively new technique of using dry ice in plugging high-pressure oil and gas wells to form a temporary, positive bridge of frozen water or mud in tubing or drill pipe so that damaged or fouled-up surface equipment can be removed.

The author, I. A. Miller, general superintendent of Otis Pressure Control, Inc., and dry-ice well-control originator, has made many significant engineering contributions to high-pressure production and control equipment.

An Early Dry-Ice Job

Sometime later, an operator called to report that one of his drilling wells had unloaded mud from the drill pipe while the kelly joint was off. The nearest available valve, which happened to be a low-pressure valve, was stabbed on the pipe immediately. Pressure in the well had built up to several times the test pressure on the valve.

The operator wanted a pressure lubricator rigged on the valve, and a removable plug choke set beneath it, in order to replace the low-pressure valve with a high-pressure one so that the well could be killed by pumping through the drill pipe. It was felt that this would be a decidedly unsafe method of replacing the low-pressure valve, and that instead an attempt to remove the valve by freezing should be made.

A plug was frozen beneath the valve, the freezing being timed by means of a sample subjected to an identical freezing treatment on the derrick floor. When the sample indicated that the plug in the drill pipe was frozen solid, the low-pressure valve was backed off and replaced by a suitable high-pressure valve. The operation was completed in a little more than 3 hours' time.

Probably the most significant factor of the method is its application of freezing a plug in the drill pipe to allow the kelly to be removed and a valve installed. The wells in every case developed considerable pressure on the drill pipe, which could not be relieved.

Three or four wells have been worked where the operators were attempting to cut off stuck tubing with $1^{1}/_{4}$-in. drill pipe and an inside cutter, only to have the well blow out. The opening through the tool joints of small drill pipe is too small to allow a plug choke to be run in on a wire line to plug the drill stem so that it could be removed from the well under pressure, or run deeper down the hole to kill the well. On each of these jobs, freezing plugs in the small drill stem, as necessary, permitted pulling the drill stem under pressure. One well required freezing 33 different plugs before the entire string, being pulled in triples, was removed from the well under pressure with snubbing equipment.

Another job was where the rams of a 10-in. blowout preventer were the wrong size and there was no other way of sealing the drill pipe-casing annulus to relieve the pressure on the preventer. A 13-in. cross was plugged by freezing the mud in it and the rams of the preventer were then quickly changed. In another instance a 7-in. casing head was frozen in order to remove a master gate and tubing hanger from the well before rigging up snubbing equipment.

One use of dry ice to freeze a plug in a well was on a job where, in fishing out wire line and paraffin tools lost in the hole, the fish, when raised to the well head, fouled the master gate, leaving no room for jar action to continue the fishing. A like situation arose in one field where the operators had unsuccessfully attempted to install under pressure $^{3}/_{8}$-in steel tubing in a well. While trying to fish this material with a wire line, the master gate was fouled and the lubricator, wth 3,000-psi. pressure on it, was filled with both $^{3}/_{8}$-in. tubing and wadded wire line. In each case a plug was frozen beneath the master gate, permitting the removal and replacement of the master gate and lubricator. When the plug had thawed out, the fish was raised above the new master gate into the new lubricator to complete the job.

Lisbon (La.) Field Well

Perhaps the best example of the application of a dry ice-frozen plug to kill a well occurred in Lisbon field of North Louisiana. This well, which had been dually completed, was in need of repair. In order to kill the well with mud, it was necessary to raise the tubing to unseat a conventional valve in the head packer and circulate to bottom.

Corrosion had so weakened the tubing string that, when it was pulled on, it parted at 1,200 ft. from the surface. The driller was unable to keep the heavy blocks ahead of the tubing as it started out of the well and when it stopped coming—as the first collar hit the rams of the tubing head—the joint bent into an almost perfect C, with the full well shut-in pressure of 2,800 psi. on the bent joint.

When mud was pumped into the tubing, it was found that circulation to only 1,200 ft. would not kill the well because, when pumping mud, the pressure never dropped below 900 psi. Whenever pumping was stopped, the pressure again rose immediately to 2,800 psi. Several days were spent attempting to kill the well with mud, but without success.

When the service crew was called on the job, it was at once apparent that there was no conventional way to plug the 1,200 ft. of tubing to permit its removal under pressure, since wire-line tools could not be run through the bent joint above the derrick floor. The ice treatment was applied to this joint just below the point at which the bend started. The joint was then cut immediately above the ice plug, threaded, and a valve put in place.

It was then a routine job to run a blank choke to the bottom of the 1,200 ft. of tubing, remove the entire 1,200-ft. string from the hole under pressure, and to go back in with a packoff overshot to complete the tubing string. After this, the entire string was picked up to unseat the packer and to permit circulating mud to the bottom to kill the well.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Alcohol as Motor Fuel

What is the octane number of alcohol? Why not use it as a motor fuel? —S. M. T.

Although the clear or straight octane numbers (motor method) of alcohols are high (see Table 1) they have low heating values or energy contents. The low heating values mean that if perfect machines were developed for complete utilization of hydrocarbon as fuels and for alcohols as fuels, the fuel consumptions of the alcohol engines would be high—theoretically 60 per cent more than gasoline for ethyl alcohol or even 120 per cent extra for methyl alcohol. In practice, the differences in fuel consumption are not great and in fact scarcely different fuel consumptions have been reported (see Table 2). Ross and Ormandy (Trans. Inst. Chem. Eng., London, Vol. 4, page 104, 1926) report a 3 or 4 per cent greater fuel consumption with a 10 per cent blend when the engine is adjusted to give satisfactory performance. Egloff and Morrell, Ind. Eng. Chem., 28, 1080, 1936, report a 5 per cent increase in fuel consumption for each 10 per cent of ethyl alcohol in the blend, but possibly only 2 per cent increase in consumption if a special engine were developed.

TABLE 1—ALCOHOL AS FUELS*

Kind of alcohol	Oct. No. (M.M.)	Heating value, B.t.u./lb.
Methyl	98	9,540
Ethyl	99	12,760
Tertiary butyl	over 100	15,520
Tertiary amyl	over 100	16,070

*Hubner and Egloff, The Oil and Gas Journal, March 31, 1938.

TABLE 2—MILEAGE USING A 10 PER CENT ALCOHOL FUEL*

Type of car	Mileage, mi. per gal.	
	Gasoline	10 per cent methanol
12-hp. Saloon	22.8	23.8
12-hp. 2-seater	24.6	25.0
16-hp. Saloon	18.8	20.6
8-hp. Saloon	46.0	41.4
12-hp. 2-seater	32.0	32.4
9-hp. Saloon	29.3	29.2
7-hp. Saloon	43.1	45.2
15-hp. 4-seater	23.6	24.8
7-hp. 4-seater	44.7	44.2
14-hp. Saloon	19.1	19.8

*Howes, D. A., J. Inst. Pet. Tech., 19, 30 (1933).

Alcohol as a blending agent is about twice as effective as benzol in increasing the octane number. Dumanois, Rev. Petr., 444, 1323 (1931) shows that 15 per cent of ethyl alcohol raised the octane number from 65 to 77. Likewise, Egloff and Morrell state that 10 per cent alcohol raised the octane number of one gasoline from 63 to 72, and of another from 61 to 70. Note, however, that less than 1 cc. of tetraethyl lead per gallon at a cost of less than 0.27 cent will cause a similar increase in octane number. Thus, the alcohol would have to sell at only 2.7 cents per gallon higher than the cost of gasoline, if it were to compete with tetraethyl lead.

Finally, water is normally associated with alcohol to the extent of 5 per cent. At low atmospheric temperatures, the water separates. For this reason the amount of alcohol that can be used with gasoline is limited to 15 to 25 per cent. Agents can be added which assist in preventing the separation of an alcohol-water layer.

Catalytic Unit Inspections Or Turnarounds

I desire to make an economic balance in order to determine the logical time to bring a unit off stream for a periodic turnaround. How should I tackle this problem? Is there any literature or what information do I need?—H. W. W.

There is probably no literature that deals directly with the economical length of time between inspections but below are listed several articles on the subject of inspections or turnarounds. The obvious place to obtain information on the economics of turnarounds would be the licensors or contracting companies that supply catalytic units.

It is doubted that the timing of inspections is directly an economic consideration. Rather, shutdowns would be most intimately related to considerations of safety, activity of catalyst, erosion of surfaces, thinning of walls by corrosion, etc. Thus, the relatively small cost of a turnaround at 100-300 days or the loss of the shutdown time may not be important in comparison with the dangers of corrosion, erosion, or accidents.

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Dirty Overhead Stocks

What methods are used to keep off-color stocks from discoloring a finished tank?—S.W.F.

Ordinarily the vigilance of the stillmen is relied upon to switch off-color stocks to "slop" storage. This is the idea of a look or sight box, and the tests that are performed at frequent intervals at the rundown house. However, H. S. Edrington in the August 1949 issue of Chemical Engineering, page 134, describes and shows a diagram of an automatic instrument control for sending the off stock to the slop tank. A photocell sights through the look box and when the beam of light is broken by the dirty stock a solenoid valve operates on the air supply to a diaphragm-operated three-way cock. When the stream clears, the diaphragm motor restores the flow to the make tank.

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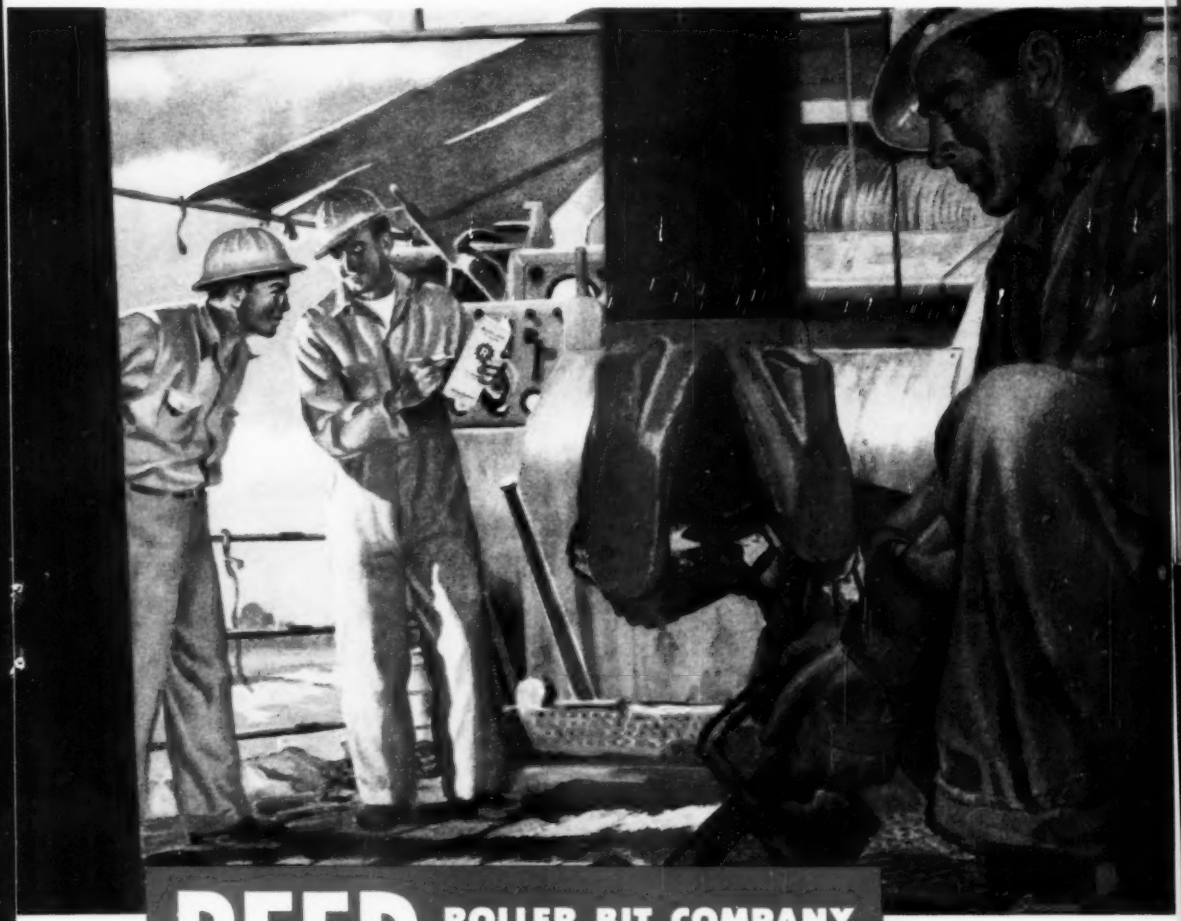

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Gas-Oil-Ratio Repair and Control

(Continued from page 87)

These questionnaires cover the period from December 1932 to August 1949. The jobs were classified as: (1) successful, (2) partially successful, or (3) failures, on the basis of the criteria previously mentioned in the paper.

Fig. 1 shows the breakdown into number and percentage of jobs in each classification. The total cost of these 503 jobs is estimated to be $1,794,000.00, or an over-all average of $3,570 per job. Nearly 85 per cent were successful or partially successful, while about 15 per cent were failures.

Fig. 2 shows a breakdown of all jobs into the 10 main classifications of jobs as previously discussed and shows the relative success of each. However, it is to be considered that these classifications cover all fields with widely varying reservoir and formation characteristics.

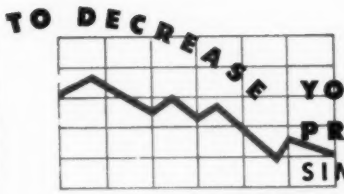
Fig. 3 shows the average cost per job of the 10 types of main classifications. Average costs varied from $356 per job for mechanical devices to $16,985 for combination jobs.

Fig. 4 shows comparative results and average costs of all work performed in each of 10 fields with the greatest number of jobs. It can be seen that the chances for success are better in some fields than in others.

Fig. 5 shows the breakdown of comparative results of jobs before and after January 1, 1946. Two hundred and twenty-seven jobs were done before January 1, 1946, and 276 were done afterwards. The over-all average cost per job before January 1, 1946, was $2,730 and after that time was $4,360. The fact that the average cost per job was approximately 60 per cent higher after January 1, 1946, is at least partially a reflection of higher costs of doing the same work. However, the number of successful jobs increased from 38 per cent to 57 per cent after January 1, 1946. The failures amounted to 17 per cent before January 1, 1946, and 14 per cent after that date.

A total of 144 successful jobs of all types in all fields which were considered to have complete and adequate information were analyzed as to gas-oil ratios before and after workovers and as to life, as previously defined. It was found that the arithmetic average of gas-oil ratios before workovers was 12,700, and averaged 1,230 cu. ft. per barrel of oil afterward for an average life of between $2\frac{1}{2}$ and 3 years.

It again should be pointed out that the gas-oil ratios both before and after workovers are arithmetic averages and includes some extremely high gas-oil ratios before repair work.



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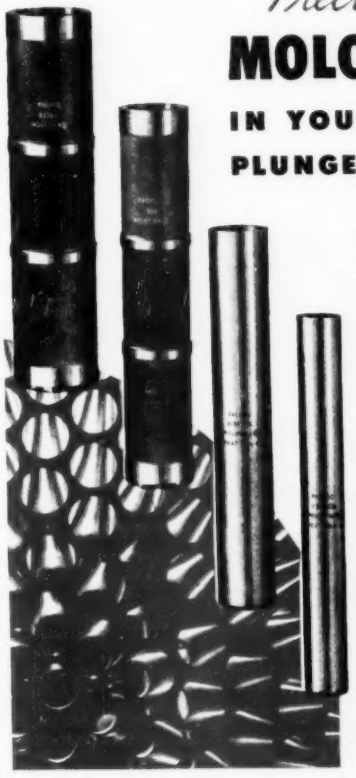

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Fourteen of the 144 successful jobs considered had gas-oil ratios over 25,000 cu. ft. per barrel of oil before workovers. Four of these 14 wells had ratios over 50,000 cu. ft. per barrel of oil. If the 14 wells with gas-oil ratios in excess of 25,000 cu. ft. per barrel of oil are not considered, the arithmetic average gas-oil ratios before repair work would be 7,600 cu. ft. per barrel of oil.

It was indicated by a rough analysis of a representative number of successful jobs of each type that cement squeeze, plugging-agent squeeze, and liner jobs have the longest life of any type of repair work considered in this report. These types of jobs probably have an average life of over 3 years. The data indicate, further, that plastic squeeze and formation-packer jobs probably have an average life of over 2 years, while selective acidizing jobs provide beneficial results for a period of only 1 year, or less.

Fig. 6 shows the analyses of failures. Out of 503 jobs, 76, or approximately 15 per cent, were failures. The reason for failure of nearly one-half the jobs was unknown because of insufficient information or lack of familiarity of the authors with the conditions prevailing in the particular well or field.

Twenty-three and one-half per cent of the unsuccessful jobs were the result of mechanical failures, such as rupturing of packer rubbers, losing cement bond after acidizing, etc. Mechanical failures were generally apparent from the data on the questionnaire forms or were specifically mentioned by the operator as the cause of failure.

Improper application was the cause of 16 per cent of the failures. Generally, these were in wells in which the gas-oil contact or other subsurface conditions were not known at the time of the work.

Reservoir conditions accounted for 12 per cent of the failures. Unless specifically mentioned by the operator in the questionnaire forms, interpretations of this cause of failure were made by the authors from their knowledge of reservoir characteristics of the various fields. These, of course, were limited to fields with which one or both of the authors were familiar. In the opinion of the authors, a large number of those jobs for which the reason for failure is listed as unknown could be properly attributed to reservoir conditions.

Conclusions

The limestone pay zones in West Texas and New Mexico have certain characteristics which lead to conditions favorable to successful control of gas and others which impose certain conditions unfavorable to control of gas.

Favorable conditions are:

1. Thick gross oil columns.
2. Heterogeneous nature of pay zones, usually containing impervious layers, although these may be of a minor nature.
3. Definite impervious streaks separating the gas and oil accumulations.
4. Competent nature of impermeable limestone or dolomite, providing suitable packer seats or shutoff points.

Unfavorable conditions are:

1. Thin oil columns immediately overlaid by large gas caps.
2. Vertical permeability along fracture planes preventing an effective seal.
3. Depletion of low permeable reservoirs to a pressure below the bubble point which results in increased gas saturation, lessened permeability to oil, and increased permeability to gas.
4. Expanding gas caps resulting in a continuous lowering of gas-oil contacts.

It can be concluded that where conditions are favorable for control of gas, as outlined above, definite benefits result from gas-oil ratio repair work. This is true in the central portion of the Wasson field, for example, where a thick gross oil column is found. A closed or depletion-type field, however, may have an expanding gas cap which may necessitate continuing workovers as the gas cap expands and gas-oil contact lowers.

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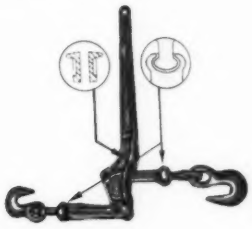

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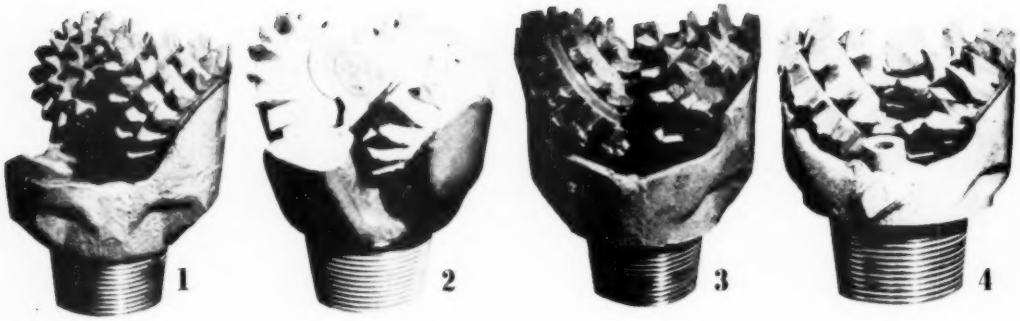

FACTORS AFFECTING

RATE OF PENETRATION

by W. J. Bielstein and George E. Cannon

THE tests described in this paper were conducted in drilling wells. Every effort was made to select formations of uniform drillability and evaluate only one variable at a time.

Bit Design

Investigations with regard to bit design were confined essentially to bits having various numbers of cutting elements and modifications to change the distribution of circulating fluid at the bit. Several tooth designs of the cutting elements were investigated to determine the relative merits of the design.

Peg-leg rock bits.—The peg-leg bit (Figs. 1 and 2) is essentially a conventional rock bit with one of the cutting elements removed. On the jet-type peg-leg bits, the cutting element was replaced with a high fluid-velocity nozzle for the purpose of changing the direction and flow characteristics of the circulating fluid at the bit. Two types of peg-leg bits were tested, viz., two and three-cutting-element bits. In each case, either a peg-leg bit was conventional water courses or a conventional bit was run within the same test section.

Typical test results are graphically illustrated in Figs. 11 and 12. As may be noted, the two-cutting-element peg-leg bit, with a high-fluid-velocity nozzle directed to the bottom of the hole, drilled the Midway shale (a medium-hard formation, Mallalieu field, Mississippi, from 7,500 to 8,215 ft.) 53 per cent faster at 10,000-lb. bit weight and 36 per cent faster at 20,000-lb. bit weight than did the conventional peg-leg bit with conventional water courses and fluid distributed on the cutting element. The three-cutting-element peg-leg bit with a single high-fluid-velocity nozzle directed to the bottom of the hole consistently drilled the Taylor shale (a soft formation, Pickton and Yantis fields, Texas, from 3,000 to 3,710 ft.) at a lower rate than did the conventional four-cutting-element bit with the fluid directed against the cutting element.

This article reports on—

Effect of hydraulic factors affecting rate of penetration?

Definite advantages are determined for increased circulation rate and high fluid-velocity nozzles directed to bottom of hole.

Effect of rotary speed and bit weight?

It was found that penetration rate increases with increasing rotary speed and bit weight.

Paper presented at spring meeting, Southwest District, A.P.I. Division of Production, Dallas. The authors are with the petroleum engineering division, Humble Oil & Refining Co., Houston.

Two-cutting-element rock bits.—Four types of two-cutting-element rock bits (Figs. 3, 4, 5, 6) were used on controlled tests to determine the comparative drilling characteristics of the two-cutting-element rock bits, with respect to fluid distribution. On each type of bit, the tooth design was selected on the basis of the formation to be drilled. The two-cutting-element bits, as designed, had smaller bearing areas than did the three and four-cutting-element rock bits and were, therefore, generally tested using lighter bit loads.

Test results on the two-cutting-element rock bits are graphically illustrated in Figs. 11, 12, and 13. The conventional design of Bit A (illustrated in Fig. 3) was modified to change the direction and characteristics of fluid discharge by installation of two high fluid-velocity nozzles directed to the bottom of the hole, as shown in Fig. 4.

In the Midway shale (medium hard formation, Mallalieu field Mississippi), the two-cutting element jet bit drilled 32 per cent slower at 10,000-lb. bit weight than did the conventional bit; whereas, at 20,000-lb. bit weight, the jet-type bit drilled 16.1 per cent faster than did the conventional bit.

In the Anahuac shale, Danbury field, and Taylor shale, Pickton field, both comparatively soft formations, Bit A, having high-fluid-velocity nozzles directed to the bottom of the hole, drilled at greater rates of penetration under most conditions than did the conventional bit. On the first series of tests, Bit A drilled from 7 per cent slower to 27 per cent faster than the conventional bit at bit weights varying from 8,000 to 30,000 lb. Only at 8,000 lb. did the drilling rate of the conventional bit exceed the drilling rate of the bit equipped with high-fluid-velocity nozzles.

On a second series of tests, the rate of penetration of the jet bit exceeded the rate of penetration of the conventional bit from 69 per cent to 122 per cent at bit weights varying from 8,000 to 30,000 lb. The lower percentage was at the lowest bit weight, indicating that directing high-velocity fluid to the bottom of the hole increases the efficiency of the bit at conditions producing higher rates of penetration.

Bit B, illustrated in Fig. 5, is a

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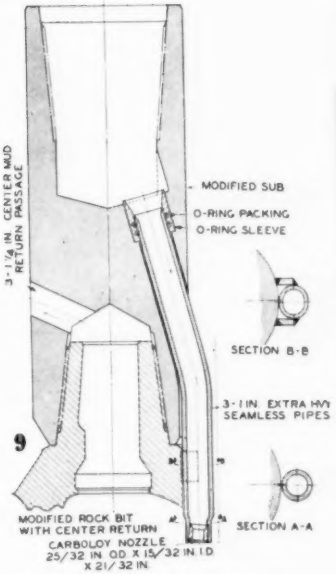
OF ROCK BITS

two-cutting-element rock bit similar to Bit A except for tooth design and cutting-element diameter, and was made for research purposes only. On competitive tests, the penetration rates of Bit B were consistently less than those obtained with Bit A, which had the high-fluid-velocity nozzles directed to the bottom of the hole, and were comparable only to the drilling rates of the conventional design of Bit A.

Bit C, illustrated in Fig. 6, is a two-cutting-element rock bit having an off-center bridge and high-fluid-velocity nozzles between the bit-cutting elements directed to the bottom of the hole. This is the initial design for this type of bit, and on controlled tests in soft formations, the penetration rates obtained with Bit C were far below those obtained with Bit A. At bit weights from 8,000 to 24,000 lb., the drilling rate of Bit C varied from 58 to 73 per cent less than the drilling rate of Bit A.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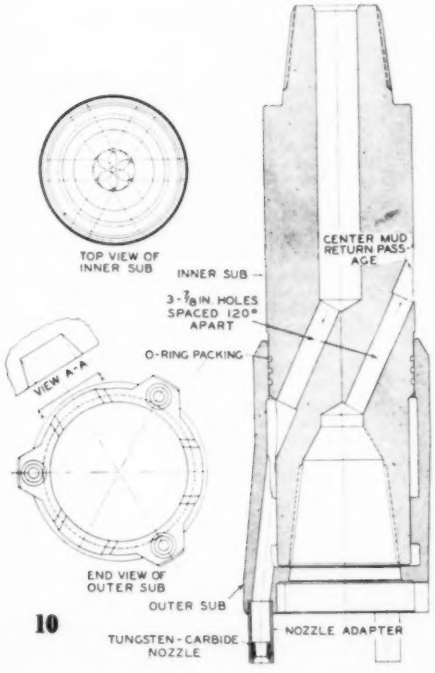
MODIFIED ROCK BIT WITH CENTER RETURN
CARBOLOY NOZZLE 25/32 IN. OD X 15/32 IN. ID X 21/32 IN.
SECTION A-A

9



10

1. Peg-leg bit, two cutting elements.

2. Peg-leg jet rock bit, three cutting elements.

3. Conventional rock bit, two cutting elements.

4. Jet rock bit, two cutting elements.

5. Jet rock bit, two cutting elements.

6. Jet rock bit, two cutting elements.

7. Shrouded rock bit, three cutting elements.

8. Jet rock bit, three cutting elements and jet adaptor sub.

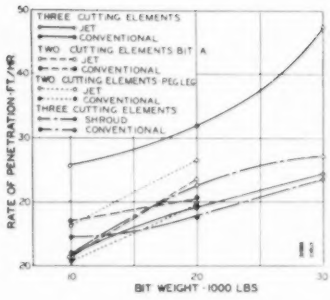
9. Sub to adapt high nozzle fluid velocity and center mud return passage, to conventional rock bit.

10. Sleeve to adapt high nozzle fluid velocity and center mud passage, to conventional rock bit.

Three-cutting-element rock bits.—Rock bits having three cutting elements have been modified principally from the standpoint of changing the fluid direction and characteristics at the bit. Bits having conventional tooth designs have been changed by use of shrouds or baffles welded between the legs for the purpose of forcing all of the fluid through the teeth of the cutting element and by directing the fluid through high-fluid-velocity nozzles between the bit legs to the bottom of the hole.

The shrouded rock bit, as shown in Fig. 7, is essentially a three-cutting-element rock bit having baffles welded between the bit legs to direct all of the fluid between the teeth on the cutting elements and to the bottom of the hole.

Results of controlled tests conduct-



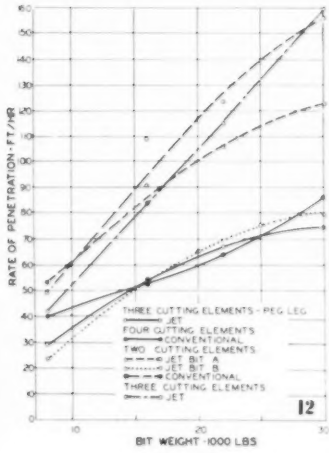
11. Relation of bit design and fluid distribution: penetration rate versus bit weight. Medium-hard formation. Constant rotary speed. Mallalieu field. Mississippi.

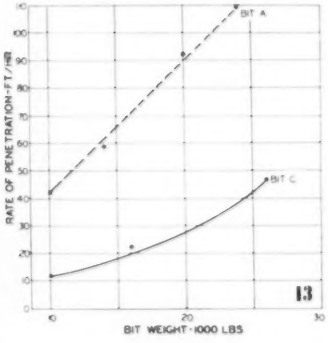
12. Penetration rate versus bit weight. Soft formation. Constant rotary speed. Pickton field, Texas.

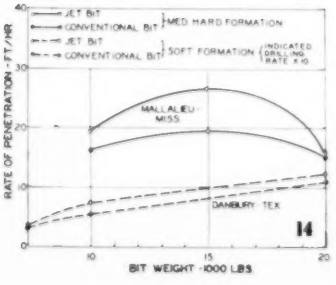
13. Penetration rate versus bit weight. Soft formations. Constant rotary speed. Danbury field, Texas.

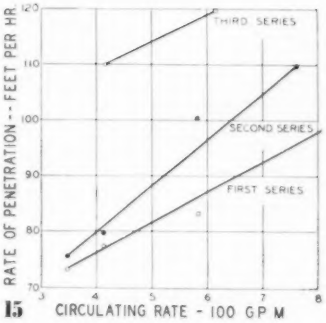
14. Fluid-distribution data: penetration rate versus bit weight. For rock bits having three cutting elements. Constant rotary speed. Soft and medium-hard formations.

15. Circulating rate versus penetration rate. For two-cutting-element jet rock bits. Constant rotary speed. bit weight, and nozzle fluid velocity.









ed on the shrouded rock bit are presented in Fig. 11. At 10,000-lb. bit weight, rate of penetration of the shrouded bit was 8 per cent less than the conventional bit; however, at 20,000-lb. bit weight, the shrouded bit drilled 43 per cent faster than did the conventional bit, and at 30,000 lb., 16 per cent faster. Apparently forcing the fluid through the teeth of the rock bit to the bottom of the hole improved the drilling characteristics of the bit, especially as conditions producing higher rates of penetration were employed.

High-fluid-velocity nozzles directed to the bottom of the hole were incorporated into the conventional three-cutting-element bit design by use of an adaptor sub, as shown in Fig. 8. In some of the larger sizes tubes were extended from within the bit body out the side between the bit legs to near bottom. This latter design proved to be unsatisfactory because of fluid cutting out the tubes.

Two designs of jet adaptor subs were used in adapting the high-fluid-velocity nozzles directed to the bottom of the hole on conventional three-cutting-element rock bits. One design (Fig. 9) had a passage for the return of mud through the center of the bit and out the side of the sub. The other design did not have the mud-return passage. A modification of the first design, Fig. 10, provided for field installation of bits on the subs; however, this proved to be unsatisfactory because of failures of the O-ring packing between the nozzle adaptor sleeve and bit sub.

Data on controlled tests of three-cutting-element bits are presented in Figs. 11, 12, and 14. As may be noted, the three-cutting-element bit equipped with the jet adaptor sub and high-fluid-velocity nozzles consistently drilled at higher rates of penetration than did the conventional three-cutting-element rock bit.

On the first of two series of tests in medium-hard formations, the three-cutting-element jet rock bit drilled 118, 68, and 96 per cent faster than did the conventional bit at 10,000, 20,000, and 30,000-lb. bit weight, respectively. On the second series of tests, the three-cutting-element jet rock bit drilled at 18, 38, and 4 per cent faster rates than did the conventional bit at 10,000, 20,000, and 30,000-lb. bit weight, respectively.

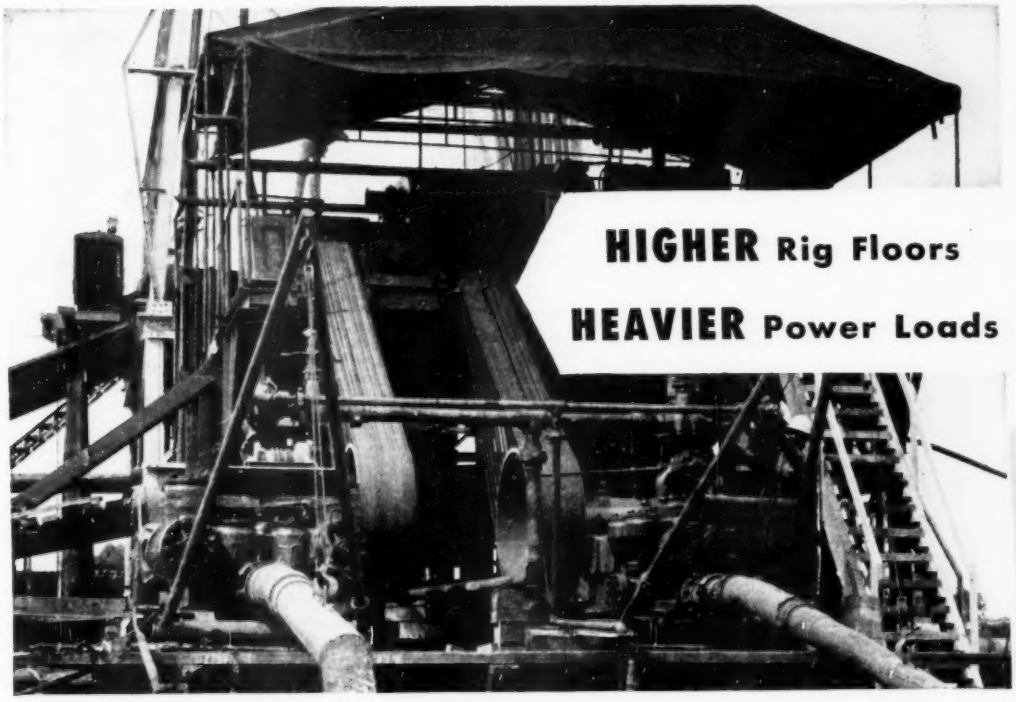
Tests run in conjunction with the latter tests, using a jet adaptor sub with a mud-return passage, resulted in the jet rock bit drilling 190 per cent faster than the conventional rock bit using 20,000-lb. bit weight. The results of this test indicated that the mud-return passage in the jet adaptor sub affected the rate of penetration; however, later tests proved that little, if any, increase in penertation rate was effected by using the mud-return passage in the jet adaptor sub.

In soft formations, the three-cutting-element jet rock bit drilled 7, 37, and 30 per cent faster than the three-cutting-element conventional rock bit at 5,000, 10,000, and 20,000-lb. bit weight.

As may be noted from the graphical presentations, the rock bits having two and three cutting elements consistently drilled at higher rates of penetration than did the conventional bits of the same design. In addition, the rates of penetration obtained with two-cutting element rock bits were equal to or higher than those obtained with three-cutting-element jet rock bits in soft formations. In medium-hard formations this trend was reversed, as the two-cutting-element jet rock bit failed to equal the three-cutting element jet rock bit. These two trends were later substantiated while investigating the hydraulic factors affecting the rate of penetration of rock bits.

The controlled tests on special bits, such as the peg-leg rock bits, with and without high-fluid-velocity nozzles, revealed that each cutting element should be serviced by a nozzle when using the high-fluid-velocity nozzles directed to the bottom of the hole. In addition, the tooth design on the cutting elements is a major factor in the final analysis of the factors affecting the rate of penetration of rock bits.

On the basis of the above controlled tests and because the two-cutting-element rock bits provided the most



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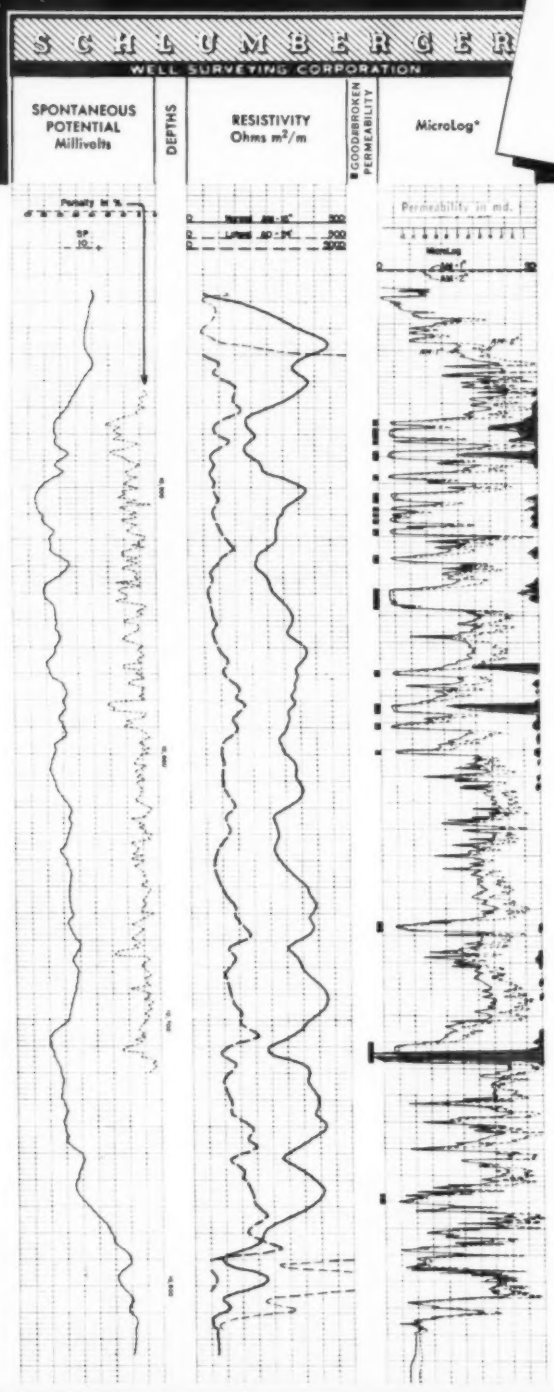
UTENSLEEP SANDSTONE IN BEAVER CREEK FREMONT COUNTY, WYOMING



Mud (Aquagel) R_m = 1.3 ohms at BHT

Bit Size: 6¾"
Spacings: AM = 16"
AO = 24'

"MicroLog": Normal 1"
Normal 2"

The "MicroLog"* is made of two curves both taken with a very small spacing in which the action of the mud is practically eliminated and the electrodes directly applied against the formation.

The "MicroLog"* is especially adapted to locate accurately the permeable sections in hard formations.

Quantitatively it is the best tool to determine the "sand count." In this example, a total count of 55 feet of permeable sandstone is shown by the "MicroLog."

* "MicroLog" and "MicroLogging" are trade marks of Schlumberger Well Surveying Corporation.

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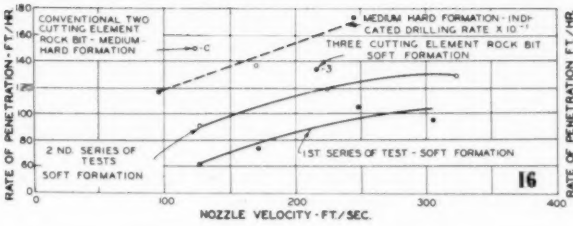
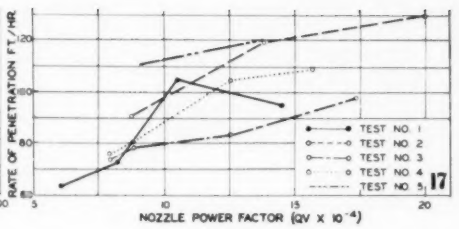
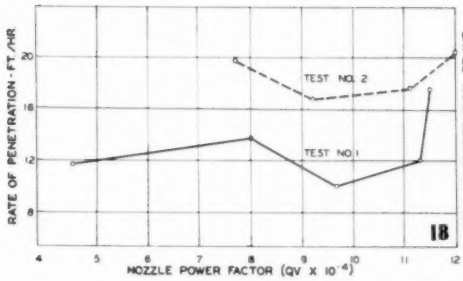
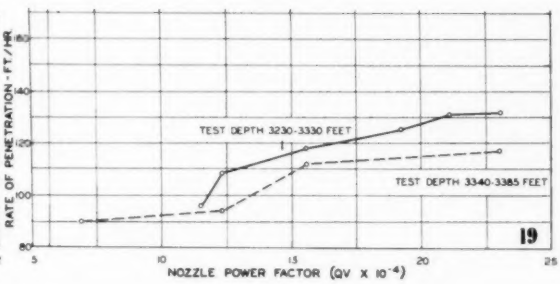
HOUSTON, TEXAS


CONVENTIONAL TWO CUTTING ELEMENT ROCK BIT - MEDIUM HARD FORMATION
MEDIUM HARD FORMATION - INDICATED DRILLING RATE X 10⁻¹
THREE CUTTING ELEMENT ROCK BIT SOFT FORMATION
2 ND. SERIES OF TESTS SOFT FORMATION
1ST. SERIES OF TEST - SOFT FORMATION
RATE OF PENETRATION - FT./HR.
NOZZLE VELOCITY - FT./SEC.
16







practicable design for incorporating high-fluid-velocity nozzles directed to the bottom of the hole, the investigation of the major factors affecting the rate of penetration has been confined to two-cutting-element jet rock bits in soft and medium-hard formations.

Hydraulic Factors

Circulating rate.—Typical test results for soft-formation drilling are presented in Fig. 15. In drilling the Taylor shale between the depths of 3,000 and 3,700 ft. in East Texas area, the general trend established was that the drilling rate increased as the circulating rate increased. On the first series of tests, the drilling rate increased 25 per cent, with a 132 per cent increase in circulation rate, and a 350 per cent increase in hydraulic horsepower.

On the second series of tests, the drilling rate was increased 46 per cent by increasing the circulation rate

16. Nozzle fluid velocity versus penetration rate. For two-cutting-element jet rock bits. Constant rotary speed, bit weight, and circulation rate.

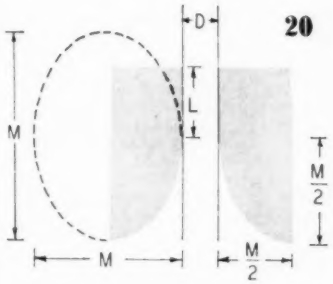
17. Nozzle power factor versus penetration rate. For two-cutting-element jet rock bits, soft formation.

18. Nozzle power factor versus penetration rate. For two-cutting-element jet rock bits, medium-hard formation.

19. Nozzle power factor versus penetration rate. For three-cutting-element jet rock bits, soft formations.

20. Cross-section showing profile of nozzle with elliptical approach and 0.986 discharge coefficient (D = diameter of nozzle bore, L = length of nozzle bore, L/D = 0.5, M = major diameter = 1.875 D, m = minor diameter = 1.25 D).

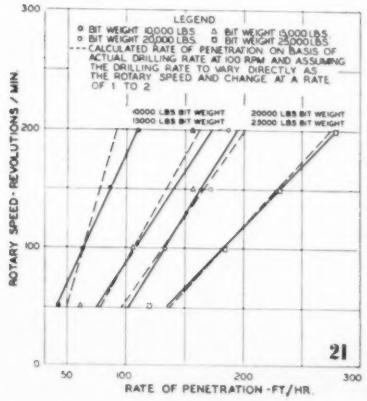
21. Rotary speed versus penetration rate.

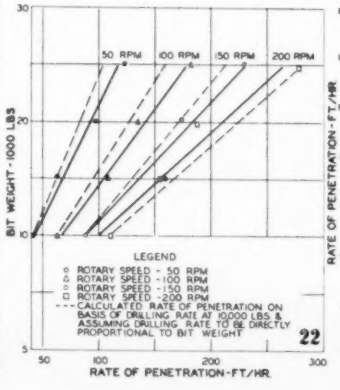


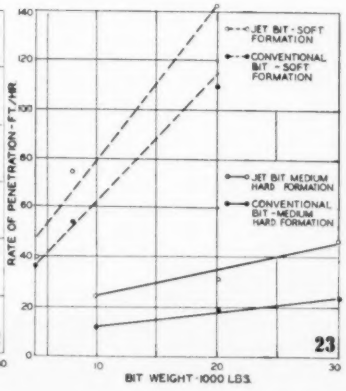
For two-cutting-element jet rock bits, soft formation.

22. Bit weight versus penetration rate. For two-cutting-element jet rock bits, soft formation.

23. Bit weight versus penetration rate. For three-cutting-element rock bits, soft and medium-hard formation.


LEGEND
BIT WEIGHT 10,000 LBS.
BIT WEIGHT 15,000 LBS.
BIT WEIGHT 20,000 LBS.
BIT WEIGHT 25,000 LBS.
CALCULATED RATE OF PENETRATION ON BASIS OF ACTUAL DRILLING RATE AT 100 RPM AND ASSUMING THE DRILLING RATE TO VARY DIRECTLY AS THE ROTARY SPEED AND CHANGE AT A RATE OF 1 TO 2
10000 LBS BIT WEIGHT
15000 LBS BIT WEIGHT
20000 LBS BIT WEIGHT
25000 LBS BIT WEIGHT
ROTARY SPEED - REVOLUTIONS / MIN
RATE OF PENETRATION - FT/HR.
21


50 RPM
100 RPM
150 RPM
200 RPM
BIT WEIGHT - 1000 LBS
LEGEND
ROTARY SPEED - 50 RPM.
ROTARY SPEED - 100 RPM.
ROTARY SPEED - 150 RPM.
ROTARY SPEED - 200 RPM.
CALCULATED RATE OF PENETRATION ON BASIS OF DRILLING RATE AT 10,000 LBS. & ASSUMING DRILLING RATE TO BE DIRECTLY PROPORTIONAL TO BIT WEIGHT
RATE OF PENETRATION - FT/HR
22


JET BIT - SOFT FORMATION
CONVENTIONAL BIT - SOFT FORMATION
JET BIT MEDIUM HARD FORMATION
CONVENTIONAL BIT - MEDIUM HARD FORMATION
RATE OF PENETRATION - FT./HR
BIT WEIGHT - 1000 LBS.
23

120 per cent and the hydraulic horsepower 296 per cent. A third series of tests run in soft formations resulted in an 8 per cent increase in drilling rate for a 49 per cent increase in circulation rate and a 181 per cent increase in hydraulic horsepower.

General trend established for the effect of circulation rate on rate of penetration is that an increase in drilling rate accompanies each increase in circulating rate; however, the rate of change of this variation has not been established. It is apparent that the increase in penetration rate to be expected by increasing the circulation rate is small as compared to the increase in hydraulic horsepower required to effect the change.

Nozzle-fluid velocity.—Tests to determine the effect of nozzle-fluid velocity on rate of penetration of two-cutting-element jet rock bits were run in soft and medium-hard formations. Typical test results are presented in Fig. 16. As may be noted, the trend established is that the rate of penetration increases as the nozzle-fluid velocity is increased. However, this rate of increase in rate of penetration with increased nozzle-fluid velocity has been somewhat erratic, based on actual test results.

In drilling the Taylor shale between the depths of 2,900 and 3,600 ft. in Pickton and Yantis fields, Texas, the penetration rate was increased 53 and 44 per cent on two series of tests when the nozzle-fluid velocity was increased 143 and 156 per cent, respectively. These percentage increases are based on basic nozzle-fluid velocities of less than 150 ft. per second.

At nozzle-fluid velocities of less than 150 ft. per second, the usual experience was that the penetration rates of jet rock bits fell below the penetration rates of conventional rock bits, and any change below this basic nozzle-fluid velocity resulted in little change, if any, in the penetration rate. At some nozzle-fluid velocity between 150 and 200 ft. per second, a sharp increase in drilling rate generally resulted, with the rate of increase in penetration rate from this point on decreasing as the nozzle-fluid velocity increased.

In medium-hard formations, i.e., the Austin chalk formation in Jourdanton field, Texas, from 6,480 to 6,600 ft., a 50 per cent increase in rate of penetration was effected by increasing the nozzle-fluid velocity 158 per cent. However, this percentage increase is based on a low nozzle-fluid velocity of 95 ft. per second and a high nozzle-fluid velocity of 245 ft. per second. Intermediate increases of 18 and 28 per cent for respective increases in nozzle-fluid velocities of 79 and 44 per cent were obtained. Within the limits of the nozzle-fluid velocities used, the results in medium-hard formations were similar to those in soft formations, in that at low nozzle-fluid velocities little change in drilling rate was effected.

TABLE 1—COMPARATIVE DATA ON WELLS DRILLED WITH CONVENTIONAL AND JET ROCK BITS
(8¾ and 8⅝-in. hole sizes)

Well—	Depth, ft. From	Depth, ft. To	No. and type of bit	Feet per bit	Total hours	Feet per hour
East Texas Division—Pickton field:						
1 H. R. Folmar	2,646	7,937	37 conventional	143	628.50	8.42
1 A. K. Jackson	2,645	7,905	31 jet	170	467.50	11.25
B-2 T. S. Gibson	2,688	7,950	27 jet	195	445.25	11.82
1 C. M. Stephenson*	2,655	7,925	37 conventional	142	517.75	10.17
West Texas Division—Bronte field:						
3 R. E. Hickman†	1,792	4,370	16 conventional	161	206.00	12.51
4 Nannie Ash	1,690	4,410	18 conventional	151	212.25	12.80
B-1 O. M. Keeney‡	1,705	4,370	14 jet	190	181.75	14.66

*Used compounded pumps. †6¾-in. hole. ‡8¾-in. hole.

Based on the rate of increase in penetration for nozzle-fluid velocities between 170 and 245 ft. per second and on performance of the conventional bit, it appears that a basic nozzle-fluid velocity greater than 200 ft. per second is required to effect a significant increase in drilling rate.

Evaluation of the circulation rate and nozzle-fluid velocity from the standpoint of nozzle power factor, which is the product of the two, indicates that a definite increase in the rate of penetration accompanies an increase in nozzle power factor.

Figs. 17 and 18 present graphically the data on relation of nozzle power factor to rate of penetration of jet rock bits in soft and medium-hard formations. As based on data presented in Figs. 15 and 16, the trend in the drilling rate is the same for the nozzle power factor as that established for nozzle-fluid velocity in soft formations. Based on minimum nozzle-fluid velocities of less than 150 ft. per second and maximum nozzle-fluid velocities varying from 306 to 323 ft. per second, the ratio of the per cent increase in nozzle power factor to the increase in rate of penetration was approximately 3:1. At intermediate values for nozzle-fluid velocity, the ratio of the two percentage increases was approximately 2:1. At higher basic values for the nozzle-fluid velocity the ratio of the percentage increase in nozzle power factor to percentage increase in drilling rate was from 4:1 to 6:1. In some instances, these latter ratios were less; however, more often than not the ratios were higher.

In medium-hard formations, the drilling rates at nozzle-fluid velocities of 200 ft. per second or less were erratic, even with substantial increases in the nozzle power factor. On the two series of tests, the only tentative trend established was that an increase in penetration rate can be expected when the nozzle power factor is increased and the nozzle-fluid velocity is greater than 200 ft. per second.

Nozzle Power Factor

An investigation to determine the relationship of nozzle power factor to rate of penetration of three-cutting-element jet rock bits revealed that the latter is a function of the nozzle power factor; however, the rate of increase in penetration rate with increased nozzle power factor was not established.

Fig. 19 presents graphically test results run in Pickton field, Texas, between the depths of 3,230 and 3,385 ft. In the first series of tests, the nozzle power factor was increased 102 per cent and the drilling rate increased 37 per cent. In the second series of tests, slightly harder formations were drilled and a 236 per cent increase in nozzle power factor resulted in a 30 per cent increase in drilling rate. The basic nozzle power factor in the latter tests was much lower than in the first. Disregarding the lowest value of the nozzle power factor obtained on the second series of tests, the penetration rate was increased 24 per cent when the nozzle power factor was increased 89 per cent.

In addition to establishing this relationship between nozzle power factor and rate of penetration of three-cutting-element jet rock bits, the tests also indicated that a higher basic nozzle-fluid velocity is required to effect an appreciable increase in penetration rate with three-cutting-element jet rock bits than with two-cutting-element jet rock bits, as the sharp increase in the rate of penetration occurred only after the nozzle-fluid velocity had increased to 267 ft. per second. The latter is only a tentative observation, as the same bit was used and both nozzle-fluid velocity and circulating rate were changed to effect a change in the nozzle power factor.

An analysis of the data on the hydraulic factors affecting the rate of penetration indicates that the penetration rates of rock bits are improved by directing the fluid to the bottom of the hole and by maintaining high nozzle-fluid velocities and circulation rates. It is also apparent that the type formation being drilled will necessarily govern the minimum nozzle-fluid velocity required to effect an appreciable increase in penetration rate.

It may be anticipated that, as the hardness of the formation increases, the advantages derived from high nozzle-fluid velocities will diminish until the major factor contributing to increasing the penetration rate will be the cleaning action of the fluid directed to the bottom of the hole,

(Continued on page 119)

DEARBORN POLYAMIDE ANTI-FOAMS REDUCE FOAMING, KEEP VITAL STEAM LINES CLEAN

These are unretouched photographs of cutaway sections of superheater tubes. The bend at the left has a heavy scale deposit—the result of incompletely treated boiler water. The bend at the right was kept free from scale because the boiler water was treated with Dearborn Polyamide Anti-Foam 659.

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THE LEADER IN WATER TREATMENT AND RUST PREVENTIVES

TRENDS IN Treating

by Charles W. Ripple*

SINCE the research method has become the main basis for evaluating leaded gasolines the picture of automotive fuels has changed with respect to octane number. This has made the refining industry more conscious of lead-susceptibility characteristics of these fuels and, in turn, brings to the fore the problem of adequate sulfur removal. A recent du Pont survey on motor gasoline octane numbers in various territories *(The Oil and Gas Journal, February 2, 1950)* shows that A.S.T.M. research octane numbers have been continuously on the increase during the past year and a half. In addition, increased production of sour crude oils has brought more sulfur into many refining operations.

As to the detrimental effects of sulfur compounds on lead susceptibility, Ryan found that the drop in lead efficiency was attributed to the sulfur compounds in the following order of decreasing severity: polysulfides, mercaptans, disulfides, thioethers, and ring sulfur compounds. Later, Livingston found that the loss in antiknock efficiency due to the sulfur compounds for a given amount of sulfur is independent of the total concentration of tetraethyl lead and is independent of the octane number of the fuel.

First Accomplished in 1925

In this regard, it is interesting to note that the separation of mercaptan sulfur compounds from gasoline was first accomplished in 1925. In this work by Birch and Norris samples of sour gasoline were treated with caustic soda. Reporting on their investigations, Birch and Norris state: "The organic sulfur compounds are readily isolated from spent soda by distillation—the spent soda may be partly revivified by boiling."

*Vice president and technical director, American Developments Corp., New York.

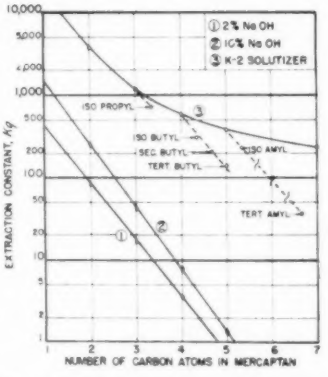


Fig. 1—Extraction of a series of pure mercaptans from isooctane at 20° C. with aqueous alkaline solutions.

This report is interesting in that it discloses much of the present gasoline-treating processes practiced in a number of refineries. In fact, it even goes to the extent of showing the acid strength characteristics of the lower individual mercaptan compounds and brings out the fact the higher-molecular-weight mercaptans are most difficult to extract with caustic soda solution.

These investigators also stated: "The ease with which mercaptans are oxidized to give disulfides is somewhat surprising; the conversion may actually be brought about by passing oxygen, or air, into an aqueous solution of sodium mercaptides.

"Lower mercaptides are very difficult to hydrolize, which fact limits the percentage regeneration of the spent caustic soda solution. It is evident that a regenerated caustic soda solution, rich in mercaptides, has decreased capacity to absorb mercaptans from sour gasoline. Hydrogen sulfide is a much stronger aicd. A solution of this substance in light petroleum, approximately 1/5N, was completely desulfurized by shaking with 5 per cent sodium hydroxide solution in 125 per cent excess An interesting confirmation of this observation was found during the isolation of the organic sulfur compounds from "spent soda," a process depending, so far as the production of mercaptans is concerned, upon the progressive hydrolysis of the sodium mercaptides present; hydrogen sulfide was not eliminated at any stage of the operation."

On January 16, 1934, U. S. Patent 1943744 was issued to Rosenstein, claiming, among other things, a two-step process of sweetening, involving first a hydrogen sulfide removal with weak alkali, followed by mercaptan removal with a stronger alkali, and regeneration of the spent

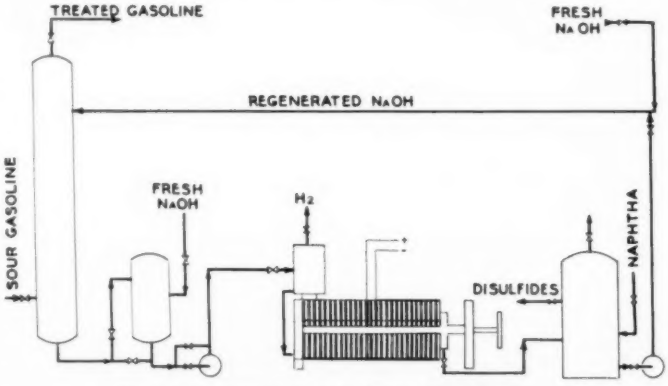


Fig. 2—Flow arrangement of the Gaylor electrolytic process.

Free Pumping

LOWERS OPERATING COSTS 66%

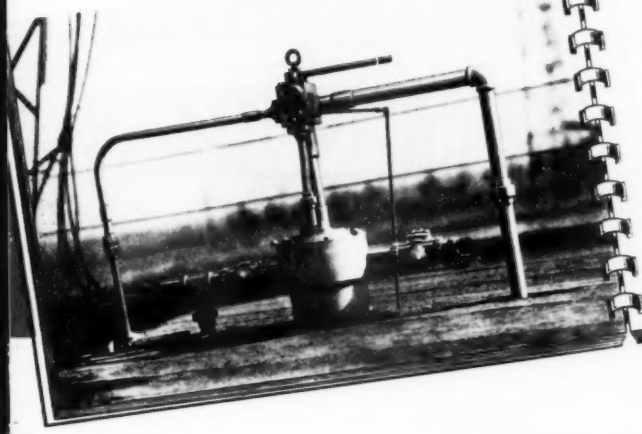
...and that's only half the story*

CASE HISTORY

Well No. 26

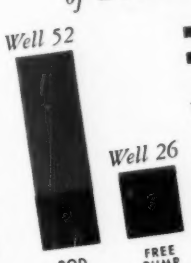
DEPTH 4710'

DOMINGUEZ FIELD, CALIFORNIA



CASE HISTORY

Comparative 4-Year Operating Costs of Two Wells on Same Lease



The detailed operating costs kept on two Dominguez wells over a period of four years (see below), dramatically reflect the savings achieved by Free Pumping. As the chart and figures show, the big difference in operating cost of the two wells is in pump pulling. Total 4-year pulling cost for the rod pump well was $871; for the Free Pump well only $37.

BREAKDOWN OF OPERATING COSTS

	Well No. 26 Free Pump (51 months)	Well No. 52 Rod Pump (50 months)	Well No. 52* Free Pump (7 months)
Depth	4710 ft.	4228 ft.	4228 ft.
Pump Repair Cost (cost/bbl.)	.58c	.53c	.00c
Pump Pulling Cost (cost/bbl.)	.05c	1.30c	.00c
Total Cost (cost/bbl.)	.63c	1.83c	.00c

***The second half of the story is even more surprising. It starts with the conversion of Well 52, with which Well 26 is compared, to Free Pumping. In seven months since the conversion was made, no expense has been incurred for repairs or pump pulling.**

The performance of *Free Pumping* recorded here is not an isolated instance. *Free Pumping* consistently reduces operating costs because it eliminates the high cost of pump pulling and downtime losses. There is no waiting for equipment. No long delays due to weather or road conditions. One man alone can change a bottom hole *Free Pump*.

Paraffin control—another big expense in some fields—is reduced to a routine operation with *Free Pumping*.

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Free Pump
KOBE

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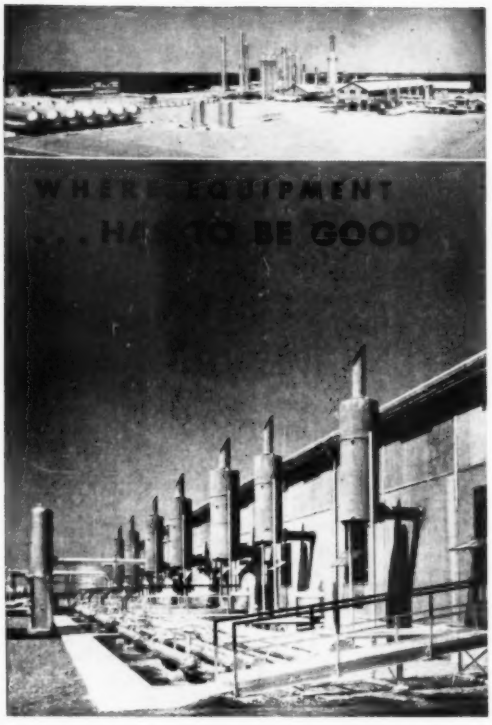

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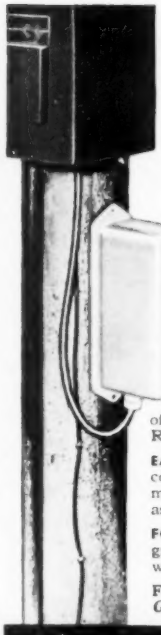

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soda solution by air blowing, steaming, etc.

Rosenstein also covers the regeneration of mercaptan caustic soda solution with air in presence of oxidation catalysts, the example of which given is sulfides or nickel or cobalt. This patent will expire on January 16, 1951.

Among the first processes introduced for more effective removal of less-soluble high-molecular-weight mercaptans is the solutizer process in which a solutizer compound is employed with the caustic as a mutual solvent for the mercaptans. Originally, this solvent was sodium isobutyrate, but apparently difficulties were experienced with replacement of the isobutyric acid by stronger acids in the gasoline, thereby reducing the solutizing efficiency of the alkali treating solution. Accordingly, sodium phenates were eventually introduced with the solutizer compounds, and their effectiveness can be appreciated by reference to the data shown in Fig. 1.

A good portion of the industry still employs a simple steaming operation to remove a portion of the mercaptans from the spent caustic soda solutions, followed by recycling of the regenerated material. After a succession of passes, the spent unregeneratable caustic soda solution is dumped. An improvement was introduced by addition to the spent caustic of about 12-16 per cent by weight of a 25 per cent tannin extract which acts as an oxidation catalyst in facilitating the oxidation of mercaptans to disulfides. However, it has been found that such catalysts are unstable unless 2.5 gr. per liter of mercaptan sulfur is recycled with the regenerated caustic soda solution fed into the naphtha treating tower.

Another method for sweetening gasoline is the Unisol process of Atlantic Refining Co., which is licensed by Universal Oil Products Co. Here, methanol is used with the caustic to facilitate the extraction of the mercaptans and the extract is fractionated after the treating to recover the separate mercaptan and methanol fractions, the latter being recycled to the treating tower.

Besides caustic soda, a contemporary process to be considered is copper sweetening by the Linde or Perco methods. The main differences between these two processes is that the Linde method involves the use of oxygen to regenerate the reduced copper chloride, whereas the Perco method employs air. Both methods convert the mercaptans to disulfides which remain in the gasoline.

A recent development in this field, which may simplify the problem of caustic regeneration is the electrolytic process introduced by Gaylor, a flow-sheet of which is depicted in Fig. 2. The process is essentially a simple one in which the spent caustic soda leaving the heating tower is passed through a filter-press-type electrolyzer, the metal plates of which are oppositely charged and separated by a liquid-permeable insulated diaphragm. Passage of direct current through plates of the electrolyzer results in generation of nascent oxygen which oxidizes mercaptans, hydrogen sulfide, and other oxidizable sulfur compounds.

The electrolyzed stream is run into a separator tank from which the disulfide layer is removed and hydrogen bled off, while the regenerated caustic is recycled. One advantage of the process is that it can be operated at ambient temperature, thus avoiding steaming and cooling costs, as well as corrosion difficulties and eliminating a considerable amount of required capital investment.

Semiplant-scale tests are reported to have shown an efficiency of 0.6 lb. sulfur removed per killowat hour.

BOOKS

MAPI REPLACEMENT MANUAL. Published by Machinery and Allied Products Institute, 120 South LaSalle Street, Chicago. 75 pp. $3.

This manual is a handbook for those having to do with reequipment and who are responsible for the health and dynamism of a manufacturing enterprise. Machinery users will find it useful in the determination of policy and organization and in the solution of replacement problems. Machinery sellers will find it useful in customer relations, in sales work, and in sales analysis.

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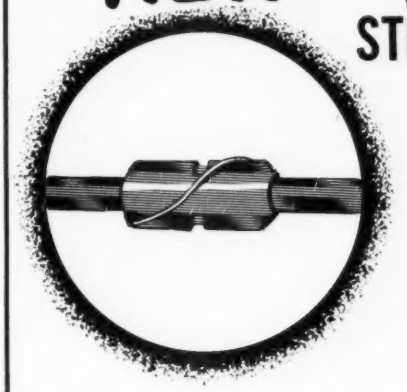

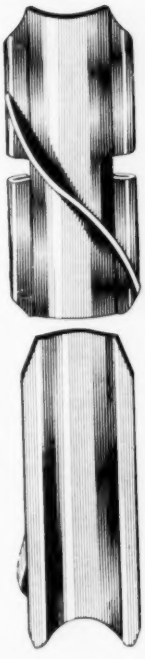

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Platforming

(Continued from page 85)

nitude of this gain being dependent upon the nature of the charging stock and the severity of the Platforming operation.

Platforming of Mixed Straightrun Cracked Gasolines

The inclusion of an olefin containing material in the charge to a Platforming unit results in the formation of a product very similar in quality to that produced from straightrun stocks alone. In view of the fact that the lower boiling fraction of thermally cracked gasoline, that is the material boiling below about 200 F., is a good fuel from the standpoint of octane number, only the higher-boiling fraction of thermally cracked gasoline should be included in the charge to the platformer. The higher-boiling fraction from thermally cracked gasolines is, on the other hand, a poor fuel from the standpoint of octane number, sulfur content, and storage stability. The conversion of this fraction to a platformate type of gasoline eliminates all these undesirable properties.

Since olefin-containing stocks usually cannot produce as much hydrogen as straightrun gasolines, the processing of cracked gasoline in admixture with straightrun is normally desirable from the standpoint of maintaining a high hydrogen concentration in the recycle gas. The processing of blends containing equal parts of cracked and straightrun naphthas proceeds very satisfactorily with a substantial hydrogen production.

To illustrate the Platforming of cracked stocks, Tables 8 and 9 give the results obtained in processing a West Texas cracked naphtha alone and a blend of equal parts of full-boiling-range West Texas straightrun gasoline and cracked naphtha. We have obtained data on the Platforming of a West Texas straightrun gasoline and found that it undergoes a normal upgrading in quality.

The results indicate that thermal

(Continued on page 119)

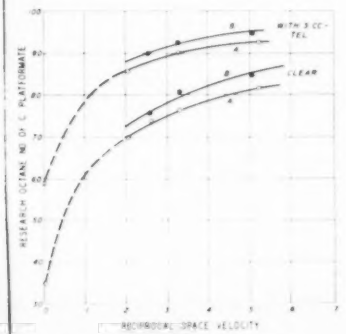
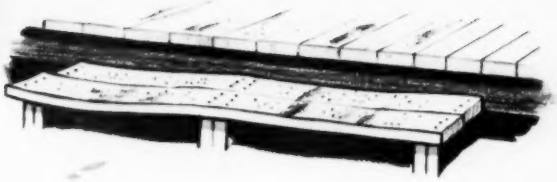


Fig. 2—Effect of space velocity.

the scars on our front porch . . .



In front of a meat market or a shoe store, the ragged state of the planks on our front porch would be a disgrace . . .

There's a blue gouge across them where a heavy part marked "Ideal" or "National", needed in a hurry, was dragged out the door to a driller's pick-up truck . . .

There are oily footprints and muddy footprints and the pocks of hob-nails. Tracks of the hundreds of guys who come in to the National Supply store because we set it up handy to them, stocked it with everything they need to drill or pump a well.

We run a service organization, not a meat market or a shoe store. That's why we're pretty proud of our thread-bare front porch with the blue-gouged planks worn down below the nail heads and pine knots.

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For your biggest problem, there's the "National" D-32, the 20-ton giant that has an API walking-beam rating of 32,400 pounds. For your smallest pumping problem, the quarter-ton D-3 has an API rating of 3200 pounds.

In between the D-32 and the D-3 are 10 other basic units, to make up scores of combinations to meet *any* pumping requirement.

Maximum pumping efficiency, long trouble-free operation and low maintenance are assured by these and other "National" features: jig-welded frames to assure accurate, wear-resistant alignment of all moving parts; beams oscillate on needle-roller bearings to reduce wear; quiet, efficient cascade-oiled gear reducers; self-aligning roller bearings in wrist pins.

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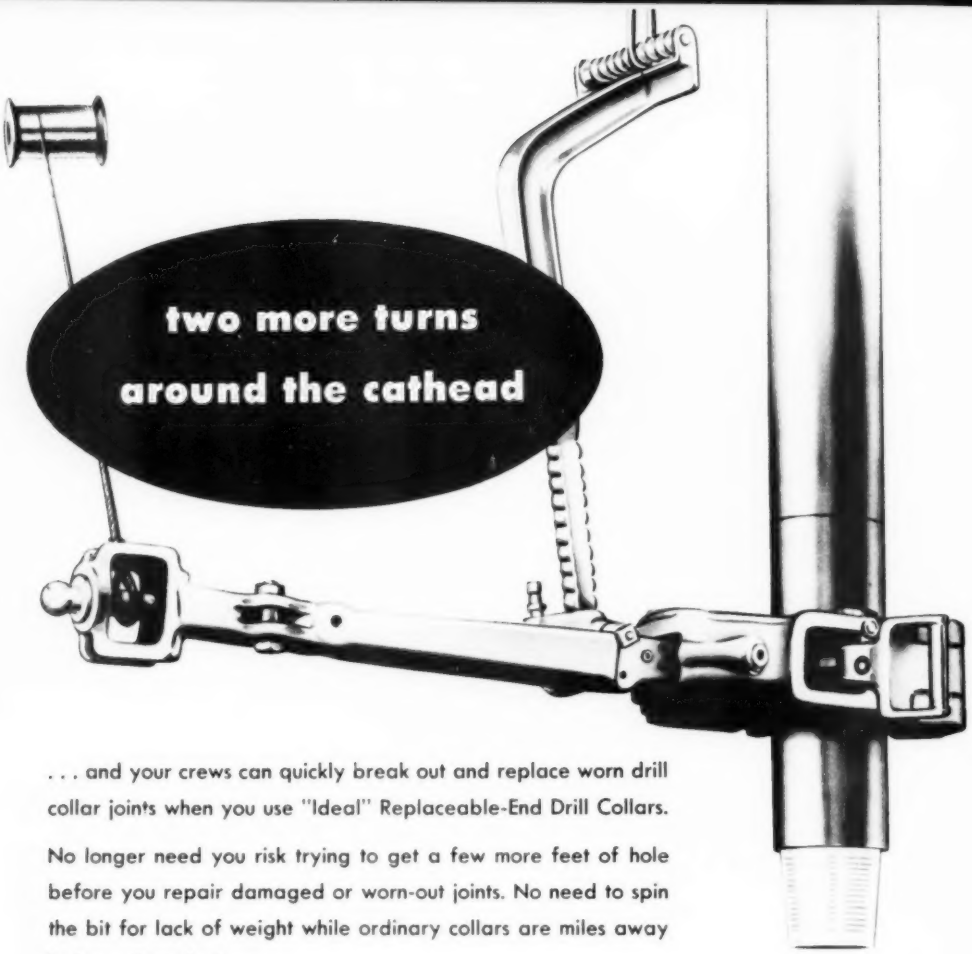

two more turns around the cathead

. . . and your crews can quickly break out and replace worn drill collar joints when you use "Ideal" Replaceable-End Drill Collars.

No longer need you risk trying to get a few more feet of hole before you repair damaged or worn-out joints. No need to spin the bit for lack of weight while ordinary collars are miles away being rethreaded.

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TABLE 8—PLATFORMING OF CRACKED NAPHTHA

Run No.—	Charge	1	2	3
Boiling range, °F.	275-387	133-420	117-420	106-426
Octane numbers:				
F-1 clear	60.2	74.9	79.6	89.1
F-1 + 3 cc. TEL	71.8	87.9	91.6	98.0
Per cent sulfur	0.49			0.0045
Bromine number	56	2	1	1

TABLE 9—PLATFORMING OF A 50-50 BLEND OF CRACKED NAPHTHA AND STRAIGHTRUN GASOLINE

Run No.—	Charge	1	2	3
Boiling range, °F.	102-394	108-407	105-408	88-406
Octane numbers:				
F-1 clear	55.9	78.2	84.4	89.9
F-1 + 3 cc. TEL	69.0	90.9	94.8	97.9
Per cent sulfur	0.33		0.0036	

gasolines are very susceptible to Platforming and very high-octane-number fuels have been produced. The reduction in sulfur content should be of interest in a number of refineries where high-sulfur crudes produce a high-sulfur gasoline on thermal cracking.

We have also investigated the properties of the blend of the platformed cracked naphtha with the untreated lower-boiling fraction of the cracked gasoline. It was found upon comparing the road performance of this blend with the road performance of the original full-boiling-range thermal gasoline that the material containing the platformed fraction was superior to the thermal gasoline by a margin exceeding 15 octane numbers.

Economics of Platforming Process

Operating cost of a platformer that has a capacity of 1,500-2,000 bbl. per stream day is shown in Table 10.

TABLE 10
Operating Costs for Platforming—1,500-2,000 Bbl. Per Stream Day Charge

	Cents/bbl reactor charge
1. Operator and part-time helper per shift	4-5
2. Maintenance	3-5
3. Taxes and insurance	4-5
4. Utilities	4-5
5. Catalyst	less than 10
6. Royalty (escalator)	7
Total	30-37

The figures shown are somewhat conservative. The value given for utilities does not include the fuel gas; however, we do find that the Platforming process is normally self-supporting from the standpoint of the heaters' fuel-gas requirements.

Estimates have been made for the cost of Platforming units. Naturally, these values will vary depending upon the local conditions. However, assuming an average labor cost in the Mid-Continent area and all new equipment these values range from about $700,000 for a 1,500-bbl. per stream day charge to reactors, to $1,600,000 for a 5,000-bbl. per stream day charge, and $2,500,000 for a charge of 10,000 bbl. per stream day.

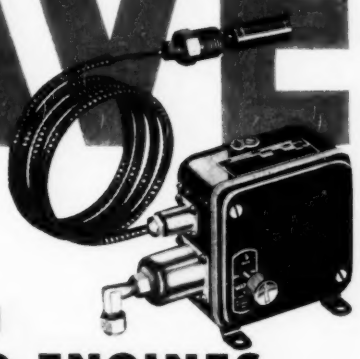
Rate of Penetration Of Rock Bits

(Continued from page 108)

which eliminates regrinding of cuttings. To date, these anticipated results have not been proved and field application of the jet-type rock bits has been limited principally because of the problem of bit supply. The use of three-cutting-element rock bits to drill formations to 8,000 ft. in the Pickton field, East Texas, area, and to 4,400 ft. in the Bronte field, West Texas, area, has resulted in appreciable savings in drilling time and bits.

Drilling data on wells using con-

SAVE



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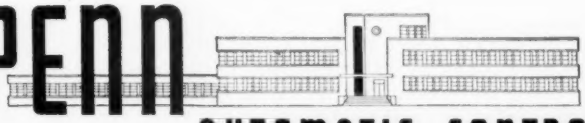

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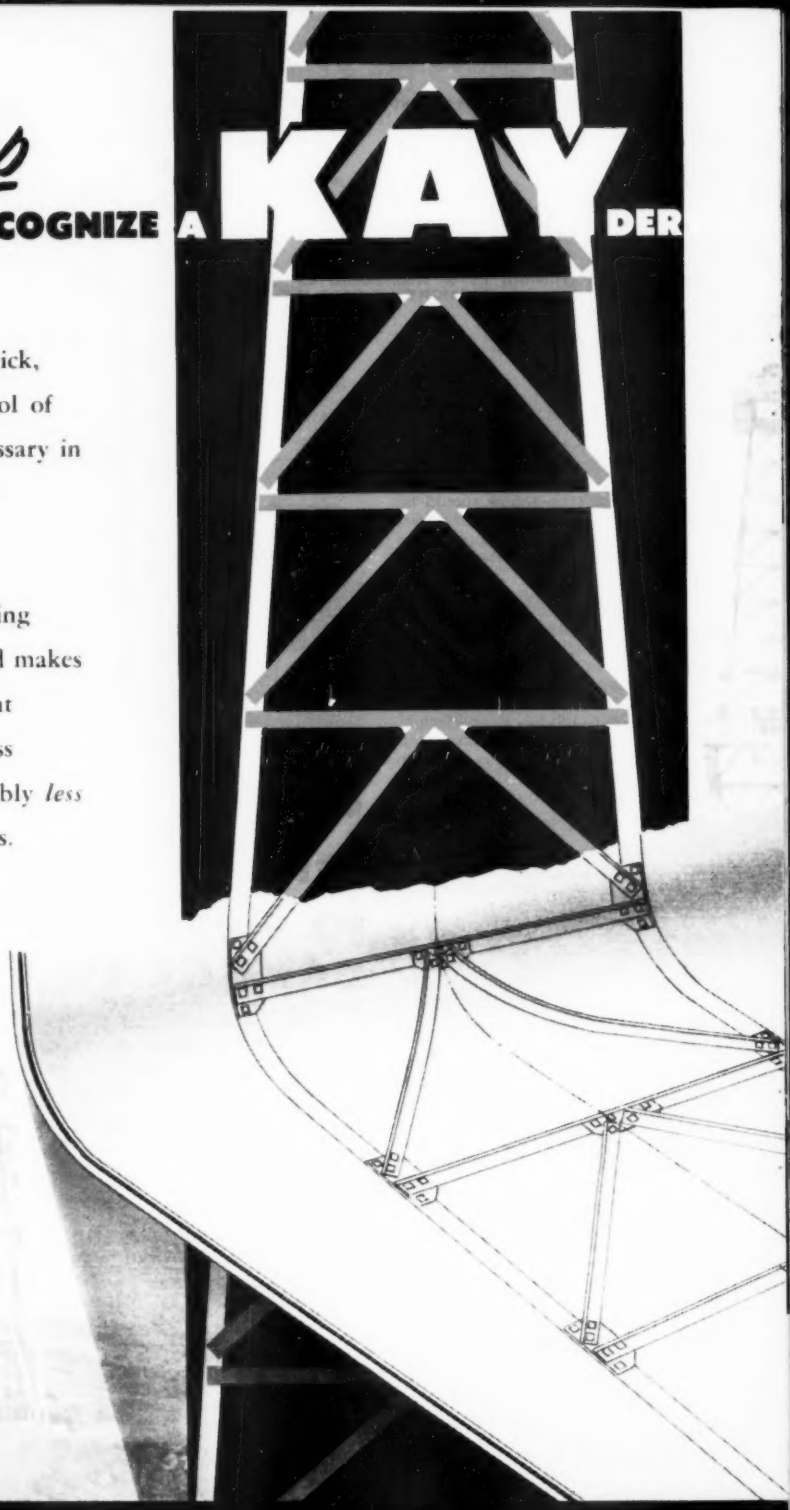

The Lee C. Moore KAY Derrick, easy to recognize, is a symbol of exacting engineering so necessary in equipment designed to drill modern wells.

The KAY-Type derrick bracing provides greater rigidity, and makes erection much easier without sacrificing strength, the stress on the members is considerably *less* than in other bracing systems.

Both Standard and Big SUPERKAY (high wind load) Lee C. Moore Derricks have KAY-Type construction. They are available for marine or land drilling, and designed for any depth from a few thousand feet to over 20,000 feet.

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ventional and jet rock bits are presented in Table 1. In the East Texas area, the drilling time on the fastest well drilled with jet rock bits was approximately 28 per cent less than the best drilling time on conventionally drilled wells and 14 per cent less than the time on the one well drilled using conventional bits and series operation of slush pumps. In addition, 10 fewer jet rock bits were used in drilling comparable amounts of footage.

In the West Texas area, an $8\frac{3}{4}$-in. hole was drilled using jet rock bits having three cutting elements. The only comparative data available on conventionally drilled wells were wells drilled using $6\frac{3}{4}$-in. bits. The $8\frac{3}{4}$-in. hole was drilled 15 per cent faster than the $6\frac{3}{4}$-in. hole, and four fewer bits were used. Because of the limited horsepower available to run the pumps, the redistribution of the fluid at the bit was the primary reason for the increased rate of penetration, as the maximum nozzle-fluid velocity used was only 243 ft. per second, with the average being approximately 190 ft. per second.

Bit-Nozzle Efficiency

The magnitude of the nozzle power factor depends principally upon the hydraulic horsepower available, the depth at which operations are being carried out, and the efficiency of the nozzle. Field tests of bits have indicated that bit-nozzle coefficients have varied from approximately 0.80 to 0.92. The higher coefficients were for nozzles of more recent design than those used on initial investigations of the hydraulic factors affecting the rate of penetration of rotary bits. Some designs of nozzles had high nozzle efficiencies at low rates of flow; however, at high rates of flow, the nozzle coefficient dropped as much as 7 per cent.

Recent laboratory tests of nozzles having various lengths and entrance and exit designs revealed that a nozzle having an entrance profile on the order of a long ellipse and a sharp exit, as illustrated in Fig. 20, provided a nozzle coefficient of approximately 0.99. Utilization of more efficient nozzles in jet rock bits will make available additional horsepower for increasing the rate of penetration. For example, a change in the nozzle coefficient from 0.8 to 0.9857 will reduce the pressure drop and horsepower loss at the nozzle by approximately 35 per cent.

Rotary Speed and Bit Weight

Rotary speed. — Limited tests have been run on two-cutting-element jet rock bits to determine the relation between rotary speed and drilling rate. These tests were conducted while drilling the Taylor shale in Pickton field between the depths of 3,100 and 3,350 ft. Results of the tests are graphically illustrated in Fig. 21.

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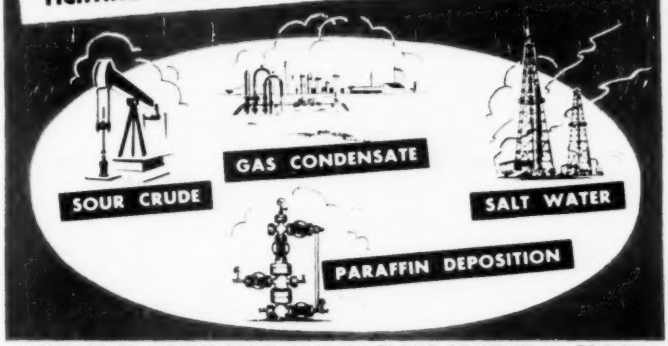

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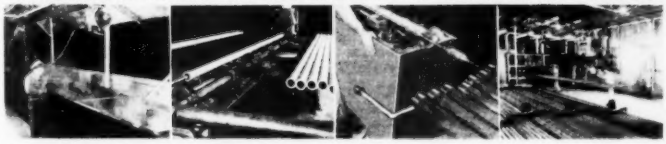

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Analysis of the data reveals that the rate of penetration increases as the rotary speed is increased and changes at a rate of approximately 1:2. This relationship, as established, may be limited to high-drillability formations and to bits having two cutting elements. Additional investigations will be required to evaluate rotary speeds on various bit designs and types of formations.

Bit weight.—Controlled tests to determine the relation of bit weight to drilling rate were conducted on various bit designs in soft and medium-hard formations. Evaluation of bit weight was made for soft formations and two-cutting-element jet rock bits while drilling the Taylor shale section between the depths of 3,100 and 3,550 ft. Results of tests are presented in Fig. 22. Analysis of the data reveals that the rate of penetration is directly proportional to the bit weight. On the basis of the actual results, some variation from the directly proportional relationship exists; however, the relationship as stated occurs more often than not.

For two-cutting-element jet rock bits in medium-hard formations, limited tests indicate that the directly proportional relationship established for soft formations also exists. For two-cutting-element conventional rock bits in medium-hard formations, limited tests indicate that the penetration rate increases as the bit weight is increased and changes at a rate of 1:4.

Three-cutting-element jet rock bits and conventional rock bits were used on controlled tests in the Midway shale formation from 7,500 to 8,215 ft. in Mallalieu field, Mississippi, and Anahuac shale from 6,150 to 6,700 ft. in Danbury field, Texas. Results of the tests are presented in Fig. 23. The relationship established for three-cutting-element rock bits, either jet or conventional, in the Midway shale, a medium-hard formation, is the drilling rate increases as the bit weight is increased and changes at a rate of 1:2.

Over-all analysis of data indicates variation from this relationship; however, the 1:2 variation exists more often than not. Three-cutting-element jet rock bits and conventional rock bits were used on controlled tests in the Anahuac shale. A directly proportional relationship for three-cutting-element jet rock bits and conventional rock bits was established for soft formations.

It has always been acknowledged that increased bit weight on rock bits increased the rate of penetration; however, the rate of increase in penetration rate with bit weight has not been determined. On the basis of the above tests, it is apparent that the rate of increase will depend largely on the hardness of the formation being drilled and will vary from directly proportional to probably as much as 10:1 for the extremely hard formations. This is principally due to the changed compressive strength and the necessity to exceed the compressive strength of formations, in order to pass from the stage of wearing out the formation to the stage of chipping and drilling the formation.

Carriage Aids Moving of Blowout Preventer

ROCKY MOUNTAIN DRILLING CO., Los Angeles, always on the alert for equipment which will reduce drilling costs, has developed a special carriage to handle heavy blowout-preventer equipment. The carriage is made entirely of steel, using wheels that ride on 4-in. drill pipe which is installed for the track.

Construction Details

Frame of the carriage consists of two sections of heavy channel iron placed above the axle that carries the double-flanged wheels. Heavy flat steel is used to connect the two channel-iron members so as to widen the floor for handling large and heavy equipment. The axles of the carriage are stationary, being attached to frame with short steel members so the floor of the carriage will clear the rims of the wheels by an inch or so.

The wheels are turned in the company shop from bar stock with the thread constructed to resemble a sheave more than a cart wheel. Wheels rotate on the ends of the axle on plain bearings and are retained with castle nuts and cotter pins so adjustment can be made for side play.

The track extends beneath the derrick floor and is made in two sections so an extension will be obtained so the carriage may be pulled across the surface pipe or casing when installing control equipment. Standards with wide flat bases support the truck under the floor and rest on the concrete pad at the edge of the cellar. The extension is connected to the main track with slip joints, so it may be connected or removed without tools. The main track openings at the ends are feathered thin on the top ends so the inserted extension rails will not interfere with the wheels of the cart.

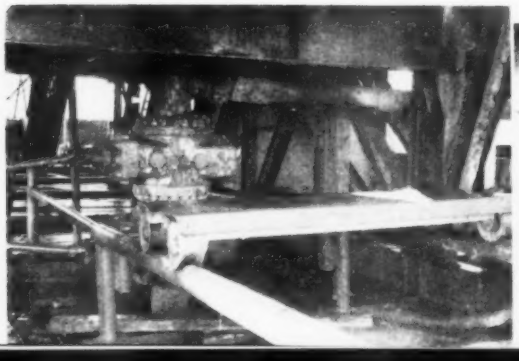
Moving the Blowout Preventer

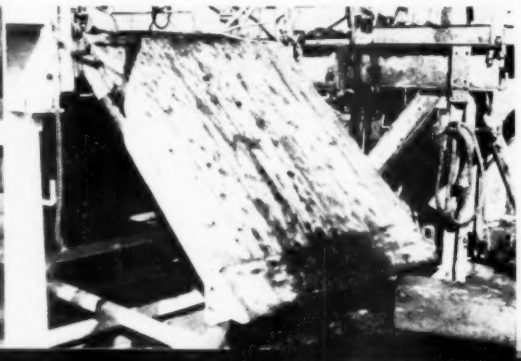
When the blowout preventer is loaded on the carriage, it can be pulled towards the derrick with the catline running through snatch blocks. And to afford free passage, after the derrick has been built and the well spudded in, the drill-pipe bumper may be raised at the lower end to clear the way for free rolling of the carriage. To accomplish this, the bumper is hinged to the sills of the derrick with plates and bolts, and is held securely to the track below with sockets welded to the side of the carriage track, and stems welded to the cross member of the bumper frame.

The frame is made of pipe and structural steel arranged so it may be covered with undressed lumber to provide the cushion necessary for tool joints when a joint of pipe is pulled in from the rack beside the walk. Hooks are attached to both lower corners of the bumper so a bridle can be attached to permit raising with the catline easily and quickly.

When the carriage with the load of equipment has been spotted over the open end of the casing, the blowout preventer is picked up in the usual manner so the carriage can be rolled backward to allow the fitting to be stabbed on the pipe.

Left: Wheeled carriage on pipe tracks used by Rocky Mountain Drilling Co. to place heavy equipment, such as blowout preventer, directly above the casing. Thus this tool can be installed without dragging across the derrick floor. Right: Hinged bumper resting in sockets attached to carriage track, so it may be lifted with the catline to permit heavy equipment to be wheeled beneath the derrick floor.





The Refiner's Notebook

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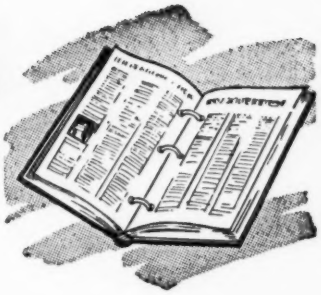

Flow Control

AS an example of flow-control application, regulation of feed and reflux rates to fractionating columns will be considered here. If the feed comes directly from a large storage tank, satisfactory regulation of feed rate might be possible through the use of a flow controller adjusting amount of opening of a valve located in the feed line. With quite steady line conditions, simple proportional (throttling) control with wide band could be used. However, if line load or pressure changes occur, leading to offset or change in the control point, it would be necessary to add automatic reset (floating) control. *(The Refiner's Notebook, March 9, 1950.)*

Most often the control system just mentioned is not applicable. A more common situation is that where the feed to the column comes from the accumulator of a preceding column. This is indicated in Fig. 1 where a fairly "conventional" control system for a depropanizer-debutanizer system is shown.

Feed to the depropanizer is from the crude column accumulator and in this case the level controller LIC-1 is used in interlocked control to reset FRC-1 which is board-mounted. Use of the level controller directly to position the control valve in the feed line might not be satisfactory since pressure changes in the feed line downstream would not be compensated for. Also, without the level controller, load change from the accumulator would be too large for satisfactory control using FRC-1 alone. By using LIC-1 as a master controller to reset the control point of FRC-1 better regulation of both liquid level and feed rate to the depropanizer is obtained, since the effect of pressure and load changes on both the supply and demand sides of the crude accumulator is minimized.

In the control system of Fig. 1, the feed to the debutanizer is similarly controlled by FRC-2 which is reset by LIC-2 on the depropanizer reboiler. Reflux rate for both columns is regulated by board-mounted flow controllers. Valve positioners might be desirable here. Pneumatic transmission is indicated throughout.

Note that control of reflux in this manner presupposes that feed composition is constant. Ordinarily where feed composition is apt to change, compensation for such change is achieved by using a temperature controller with primary element set at the proper point in the column as determined by the temperature and composition gradient through the column. This controller could be used to position a control valve in the reflux line. Where feed composition is constant and temperature control is not practical (as would be the case where the temperature gradient is such that a suitable point for location of temperature measuring element does not exist) control of reflux rate as shown in Fig. 1 would be in order. Alternatively, the level controllers on the depropanizer and debutanizer reflux drums could be used to position valves in each of the reflux lines, with flow controllers on the overhead product lines.

Since the proper ratio must be maintained between feed rate and reflux rate the control system of Fig. 2 may be employed under certain conditions. The level controller on the feed accumulator acts as a transmitter resetting the control points on locally mounted flow controllers for both feed and reflux lines. The flow of feed and reflux are secondary variables and their rates of change are regulated in proportion to each other according to rate of change of the primary variable which is liquid level.

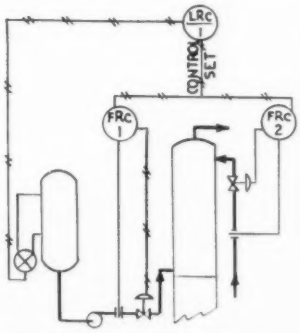

Fig. 2—Ratio flow control of feed and reflux.

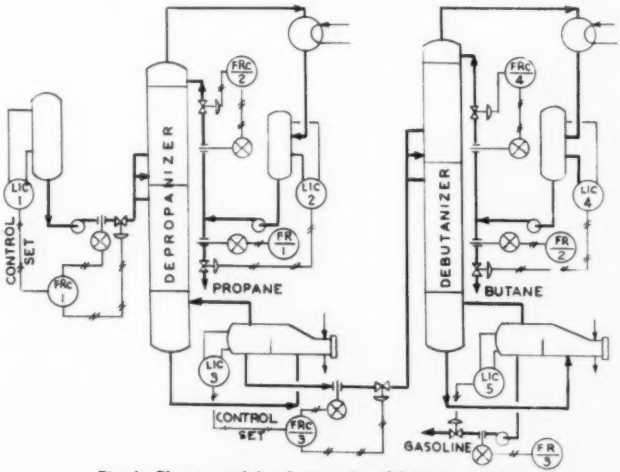

Fig. 1—Flow control for depropanizer-debutanizer system.

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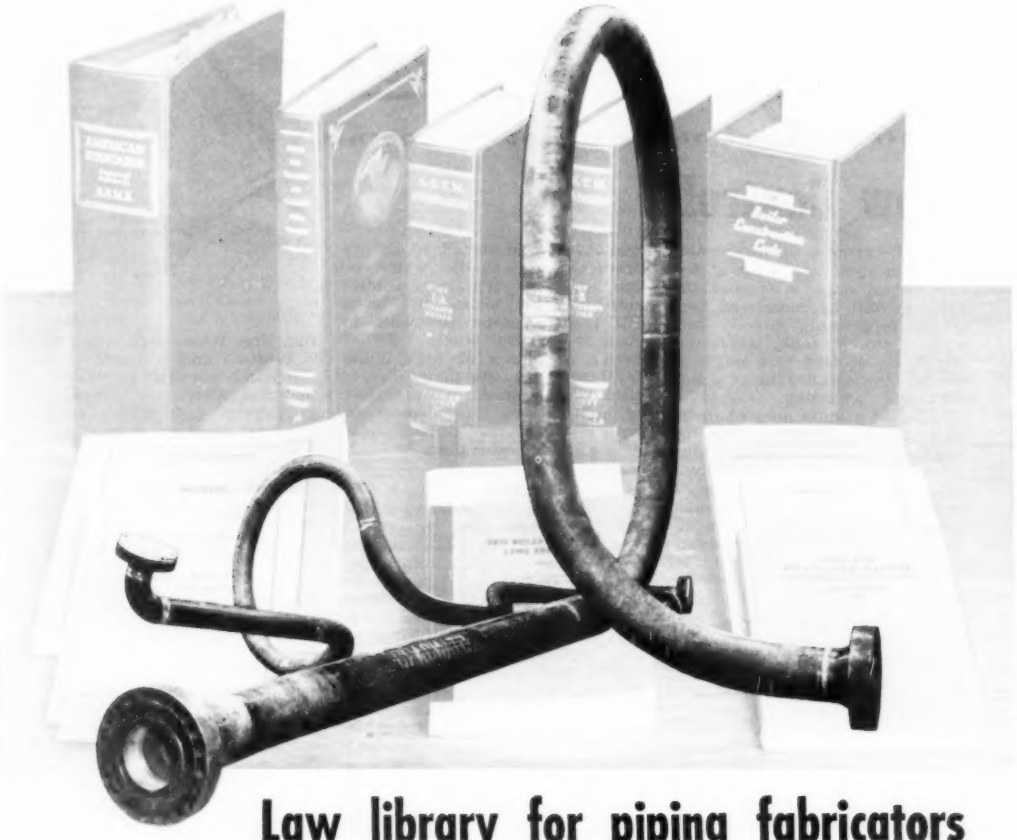

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Change in Gas Flow With Pressure

THE permeability of a rock defines its capacity to transmit fluids. A value for permeability can be calculated according to Darcy's law by flowing a measured amount of fluid through a rock sample under given pressure conditions. The flow capacity measured for any two liquids will be the same, but the flow capacity measured for a gas will depend upon the individual gas and the mean pressure of flow. In measuring a rock permeability by gas flow it is therefore necessary to make a correction for the type gas and mean pressure. Also in using a permeability to compute gas flow this correction must be applied. Although the correction is not ordinarily large, it is important in some considerations and is therefore reviewed.

The measured permeability of a porous material to a gas is greater than that to a liquid. The explanation given for this behavior is that the liquid has a zero velocity at the wall past which it flows but that the gas has a finite velocity at the wall. The gas is said to exhibit "slippage."

The amount of gas slippage is a function of the mean pressure of gas flow and of the particular rock specimen. The change can be represented by the following:

$$k_a = k(1 + b/P_m) \qquad (1)$$

where k_a is the permeability calculated according to Darcy's law at the mean pressure of flow, P_m, k is the permeability of the porous material (that value obtained by the flow of a liquid), and b is a constant which varies with the type of rock, the type of gas, and the permeability.

Equation 1 is a linear relationship between the computed values of permeability and the reciprocal of the mean pressures, as shown in Fig. 1. The values of b shown for these three hydrocarbon gases on this specific core are 0.82, 0.53, and 0.35.

The variation of b is such that the percentage difference between k and k_a for a given mean pressure increases as the permeability decreases. For cores of one darcy there may be but 5 per cent variation between k and k_a measured at one atmosphere but for cores of one millidarcy there may be several hundred per cent variation between k_a measured at one atmosphere and k. The variation in b is also such that for any core the values determined with different gases are always in the same order. As indicated in Fig. 1, the more complex the hydrocarbon gas, the closer the permeability measured with that gas will be to the permeability measured with a liquid.

The uses to which permeability are put for operating calculations are subject to sufficient inexactness that this variation in permeability is within the experimental error of calculation. The relative change in flow rate which this change would cause for a gas reservoir under a given pressure differential at high and low pressures can be shown to be small.

Example Calculation

Assume methane gas in a reservoir of permeability characteristics shown in Fig. 1. The equation for the permeability change is:

$$k_a = 2.72\left(1 + \frac{0.82}{P_m}\right) \qquad (2)$$

Assume the reservoir were at first under a mean pressure of 2,000 psia. The value of k_a would be 2.74. Assume now that the reservoir has been produced at 200 psia. mean pressure. The value of k_a is then 2.88, an increase of 5 per cent. Thus, for the same pressure drop of flow, 5 per cent more gas would flow under reservoir conditions per unit of time at the lower mean pressure than at higher mean pressure. In terms of a gas-well backpressure test, values of $Q/(P_r^2 - P_f^2)$ would differ by this percentage at the two different mean pressures, provided viscosity variations due to the pressure change were taken into account.

If a gas shows slippage when it fully saturates a porous specimen, there is no reason why it should not also have slippage when it partially saturates a porous specimen. This has to be considered in relative permeability measurements. A value of gas relative permeability greater than unity would be obtained by measuring the rock permeability by correcting for slip (i.e. use a liquid) and effective permeability to the gas without correcting for slip. This error would of course be more pronounced at atmospheric pressures than at reservoir pressures.

Where the permeability is to be used as a correlating tool it is no doubt quite important to correct for slip in measuring permeability, because in correlation work the individual quantities being used can usually be measured to smaller errors than the slip correction. A correlation in the range where slip was appreciable would therefore be in error.

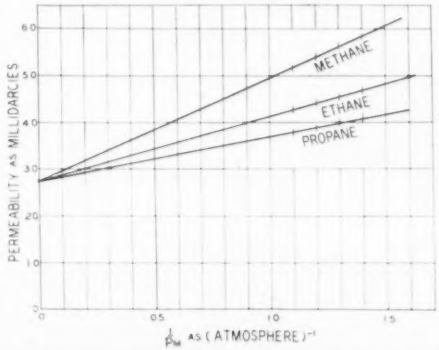

Fig. 1 — Variation in gas permeability with mean pressure and type of gas.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

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instruments and industrial machinery. The booklet will be of interest to all who are concerned with the manufacture, care, and maintenance of material which is normally subject to corrosion. *Manchester Oil Refinery, Ltd.*

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10 ROCK BITS. Illustrated folders showing designs of Varel rock bits are printed in full color. The folders have been issued in English and Spanish editions. A complete line of rock bits in a wide range of sizes and designs, consisting of three-cone, two-cone, and blade-type bits, is described. *Varel Manufacturing Co.*

11 OIL-FIELD ROPES. In particular there are comparisons between nylon ropes and manila ropes and also, useful information on the handling and installing of rope and of its general care and maintenance. *British Ropes, Ltd.*

12 RENT THE TOOLS YOU NEED. This 36-page, pocket-size book is a price guide and stock list of oil-well equipment supplied on a rental basis. The booklet also contains illustrations and warehousing facilities and yards at Oklahoma City; Duncan, Okla.; Odessa and Alice, Tex.; and Casper, Wyo. *Phil A. Cornell & Co.*

13 PAINTING WITH ALUMINUM. A comprehensive, 32-page brochure points out that while the company does not make or sell aluminum paint, it feels obligated to explain how aluminum can be used to best advantage. Profusely illustrated, the book uses 30 photographs to show proved applications of aluminum paints over the years, ranging from oil refineries to industrial fencing and bridges. Several pages are devoted to questions and answers and an aluminum-paint coverage table. *Aluminum Co. of America.*

14 EXCEL-SO METER CALIBRATING TANKS describes models ranging from 50 to 2,000 gal. and 2, 5, 10, 20, and 30 bbl., in either stationary or portable, with or without springs, open or closed-type necks, and with electric or pneumatic brakes. *Warner Lewis Co.*

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16 USEFUL FACTS ABOUT CANADA for oil and allied industries is an attractive, fabric-bound, 56-page book dealing with regulations governing the petroleum industry in Canada. In addition to a large wall map of Canadian oil country, the book presents discussions on such subjects as foreign exchange, income taxation, types of incorporation, leases and reservations, conservation legislation, customs regulations, immigration, and a synopsis of exploration for oil in western Canada. *Canadian Bank of Commerce.*

17 HIGH-PRESSURE INDUSTRIAL POWER PUMPS. The first section of this 2-color, 28-page booklet describes applications and offers evidence of economical performance in a variety of industries. The remainder of the book illustrates outstanding features. *John Bean Division of Food Machinery & Chemical Corp.*

18 M-SCOPE combines reprints of three articles on electronic pipe locating and leak detecting. Articles included are "Electronic Pipe Locators and Leak Detectors," by Herndon David; "Electronic Pipe Finding and Leak Locating," by Curt R. Fisher; and "Locating Lost Sewers and Manholes," by E. T. Cranch. *Fisher Research Laboratory, Inc.*

19 LECO CARBON DETERMINATOR describes the adaptation of this equipment for the determination of carbon in catalyst. The method has proved to be precise, accurate, and rapid. The folder includes a general description of operating procedure. *Laboratory Equipment Corp.*

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THE OIL AND GAS JOURNAL
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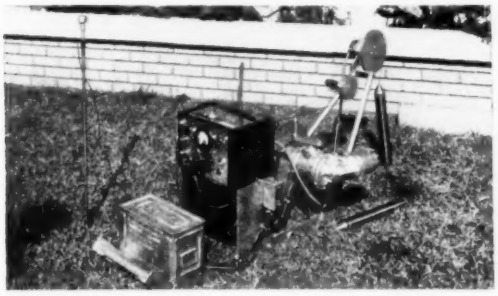
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Dan B. Miller

20 WELL-LOGGING UNIT. A new type well-logging unit capable of logging shallow structures to a depth of 1,500 ft., particularly adaptable to the West



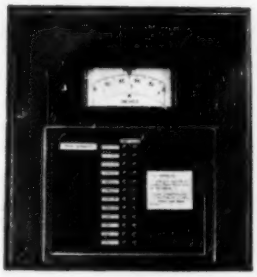
Texas regions and similar formations, gives straight-line direct-inking chart recordings. The width of the chart is 4 in., in a 105-ft. roll, graduating 10 to the inch. The chart drive is reversible so that log can be made going in or coming out of hole. Unit records monoelectrode resistance; sensitivity of 20, 50, or 100 ohms for full 4-in. width of chart. Chart moves 1 in. for 20 ft. of electrode movement. Easily portable in the trunk of a car. Weight of the recorder is 25 lb. Weight of the reel assembly is 85 lb. and reel capacity is 1,500 ft. The recorder operates on 6 volts, has a built-in test circuit to check operation and calibration, and motor-driven reel for going in and coming out of hole. *Technical Instrument Co.*

IT'S NEW CHECK IT

21 NEW CHARTS AID IN TOWER DESIGN. Two large volumes of charts containing liquid-vapor equilibrium constants, and one large volume containing fugacities for light hydrocarbons in mixtures, based on the Kellogg Equation of State, are considered the most accurate available today, as they have been checked by application to multicomponent experimental work performed in laboratories. These graphs are not only functions of temperature and pressure but are also a function of the composition of both the liquid and vapor phases. The charts cover pressures graduated from atmospheric to 1,000 psia. for any mixture of hydrocarbons from methane to n-heptane, including unsaturates. For higher pressures Kellogg has made available fugacity charts that go from 1,000 to 3,600 psia. Instructions for use and sample calculations for bubble points, dew points, and equilibrium flash points are included. *M. W. Kellogg Co.*

IT'S NEW CHECK IT

22 ELECTRONIC PRECISION REMOTE-READING TANK-GAGE SYSTEM. This new development incorporates the Brown continuous balance Electronik precision indicator. The system uses 110-volt a.c. source, reduced to 6.3 volts for energizing the measuring circuit. The low voltage used puts this system in the class of communications equipment, and permits the use of small-gage wire. Only four leads are required for each tank to be gaged, and there are no field relays of junction boxes needed, as each transmitter is directly connected to the receiver. This electronic gaging system is adaptable for use with any of the standard S&J automatic tank gages for both low and high-pressure storage tanks. *Shand & Jurs Co.*



IT'S NEW CHECK IT

23 OIL-FIELD PACKINGS. Featured in the new line are valve cap and cylinder-head gaskets for all slush pumps, with each gasket plainly stamped for the pump it fits. This method of identification assures delivery of the correct gasket, without measuring or matching of the worn gaskets. Also included are Otiseal liner packings, Otis Tell-Tale liner packing assemblies, and Otis washpipe packing. *Otis Equipment Co.*

IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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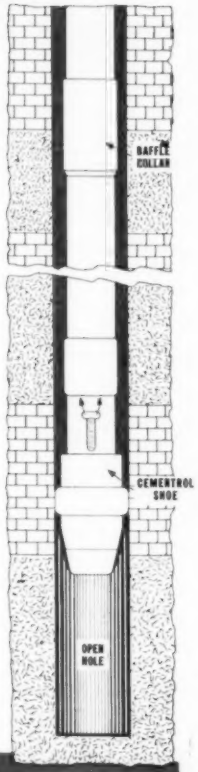
PROTECT LOW PRESSURE PRODUCING FORMATIONS *with* Cementrol

Keeping cement completely out of the oil and gas formations in a well bore is the vitally important job that the Larkin **CEMENTROL** does economically and with complete safety.

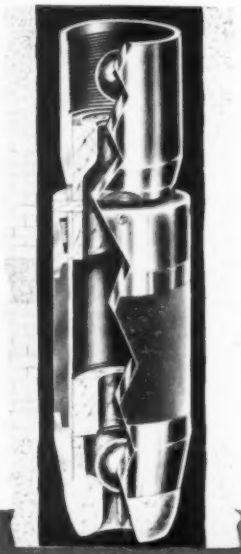
CEMENTROL is **FIELD DESIGNED, FIELD TESTED, FIELD APPROVED,** and for five years has been standard equipment in areas where exposed formations must be protected from cement contamination.

Your supply store carries a complete line of **CEMENTROL** equipment and can supply information about the several other profitable ways it can be used.

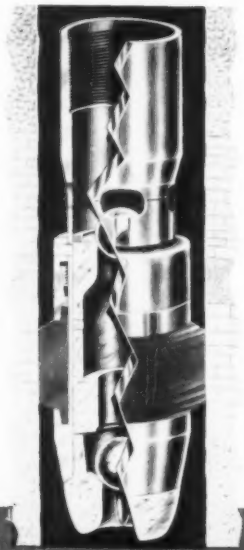


Here's how CEMENTROL does the job. The CEMENTROL Shoe puts cement right where it's wanted.

Cement shown in red.



Running-in position . . . serving only as a float Shoe.



Position after expansion by pump pressure.

LARKIN

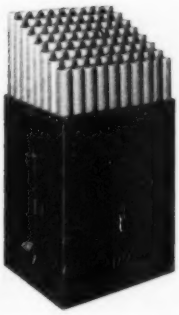
...Through Your Supply Store

LARKIN PACKER CO., INC.

ST. LOUIS, MO.

24 NEW TWIN-SEAT VALVE to replace the ball and seat in subsurface oil-well pumps. The twin-seat valve eliminates flutter and pump slippage, producing more fluid per stroke. Its two seats double the resistance to corrosive liquids and abrasive sands. It seats steel-to-steel and is backed up with a rubber-to-steel sealoff. Experience has demonstrated that if the steel seat or valve is impaired by corrosive or abrasive fluids, the rubber-to-steel seal-off will perform 100 per cent effectively. *Stewart Manufacturing Co.*

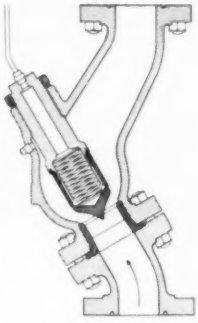
IT'S NEW CHECK IT



25 TUBRAK, a new inexpensive filing cabinet for maps and tracings has a lattice construction which holds the mailing tubes. Lattice work can be varied to user's specifications at no extra cost to accommodate 2, $2\frac{1}{2}$, or 3-in. tubes which can be purchased with bin. The bin is keyed by numbers in front and by alphabet letters on the side thus providing immediate location of and drawing. *Scott-Rice Co.*

IT'S NEW CHECK IT

26 GROVE FULLSTREAM CHECK VALVES. These valves are available in two types: the wide-open check valve for line-check services and the fullstream compressor check valve. Either type of valve may be had in the "S" series, in which there is only a 30° change in flow direction, or the "SL" series 90° angle valves. Outstanding feature is the extremely low pressure drop, in the 2-in. size equal to less than 7 ft. of pipe. An O-ring seal seals the piston when the valve is open, eliminating the danger of sticking due to corrosion, dirt, and waxing. The orifice is easily adjustable to control the speed of closure. No dismantling of the valve is necessary for orifice adjustment. Moving parts are made of corrosion resistant material. Available in a full range of pressures and sizes. *Grove Regulator Co.*



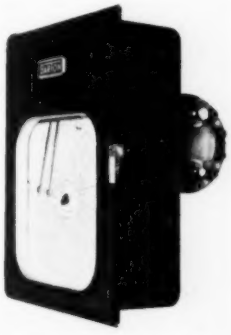
IT'S NEW CHECK IT

27 NEW 4-TON HEAVYWEIGHT TRUCK. Designated as the Y and YA models, the new trucks have a nominal rating of 4 tons, a gross combination weight of 50,000 lb., and a gross vehicle weight of 28,000 lb. A completely new engine that develops 330 lb.-ft. gross torque was designed for the new 4-tonner. The six-cylinder engine delivers 154 gross horsepower, has a compression ratio of 6.5 to 1, and a displacement of 377 cu. in. Important new engine features include twin carburetors, twin manifolds, a twin exhaust system, and

hydraulic valve lifters. Body and payload allowance runs to 19,800 lb. Trucks are built with wheelbases of 130, 142, 154, 172, and 190 in. The chassis features a rugged $10\frac{1}{8}$-in.-deep channel frame with either seven or eight cross members. The rear axle has a capacity of 18,000 lb. A rear axle of 22,000-lb. capacity also is available. *Dodge Division, Chrysler Corp.*

IT'S NEW CHECK IT

28 MODEL 202 RECORDER, a ruptureproof bellows-type flow meter, is now equipped with an internal, adjustable pulsation dampener. Ruptureproof bellows-type meter is completely self-draining. When gas is being measured any slugs of liquid entering the meter housings will drain out of the housings. Fitted with a torque tube instead of a pressure-tight bearing to insure permanently high accuracy and freedom from lubricant and leakage problems. The dampener controls the rate of flow of the hydraulic fluid from one bellows chamber to the other. Adjustment may be made while the meter is in service. Because the hydraulic fluid is permanently sealed within the bellows mechanism, the pulsation dampener assembly can never plug or lose its effectiveness. *Barton Instrument Corp.*



IT'S NEW CHECK IT

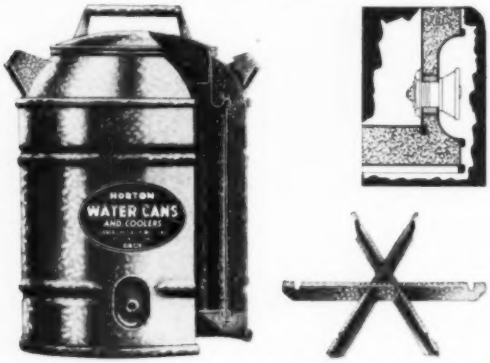
29 STUD REMOVER, NO. S-60B, is designed for use with $\frac{1}{2}$-in. square drive handles and attachments. It is equally efficient for removing or setting studs. An eccentrically mounted roller with deep milled edge provides a nonslipping gripping surface which is nonburring. Stud capacity is 5/16 to $\frac{3}{4}$-in. diameter. Made from selected alloy steel, heat treated, and chrome plated. *J. H. Williams & Co.*

IT'S NEW CHECK IT

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

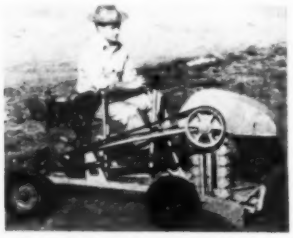
30 WATER CANS AND COOLERS. The coolers incorporate unique recessed spigot flush with the o.d. of the cooler, which eliminates possibilities of damage.



Both the coolers and cans feature a one-piece inside neck, one-piece outside crown, three interlocked channel bottom supports, and double-lock seams. They are manufactured both in a heavy duty insulated construction in sizes from 2 to 10 gal., and in a standard type which does not include insulation. *Turner Specialty Manufacturing, Inc.*

IT'S NEW CHECK IT

31 DITCH WITCH is a new type, completely portable ditching machine. It is light enough to move from location to location by means of a light trailer or pickup. It fills the broad gap between manual ditching and existing large ditching equipment. The hand-fed, ratchet-type digger enables the operator to dig as fast or slow as soil conditions permit. Digs ditch $4\frac{1}{2}$ in. wide to a maximum of 30-in. depth but can dig wider ditches by taking multiple cuts. Can be used as close as 8 in. to fences or foundations. An adjustable scraper follows the digger, giving a sharp, clean-cut ditch. Spoils can be deposited on either side by the spoil chute. Powered by a 6-hp. Wisconsin. *Charlie's Machine Works.*



IT'S NEW CHECK IT

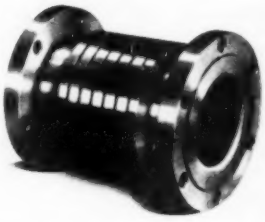
32 TAP AND DIE SET for slush pumps and blowout preventers is intended primarily for field use in cleaning up smashed or dirty threads on piston rods, cross head or extension rods, valve cover, and end plate studs. It is available in various diameters from $\frac{5}{8}$ to $3\frac{1}{4}$ in. with 11, 10, 9, 8, 7, and 6-pitch threads, as specified per diameter. *Baird Manufacturing Co.*

IT'S NEW CHECK IT

33 TWO-CONE ROCK BIT gives exceptionally good footage, with fast drilling rates, in a variety of soft to medium-hard formation. Principal feature is its extremely effective circulation, with twin jets properly positioned to agitate and assure fast removal of the cuttings, and prevent balling up of the cutter teeth. Construction follows that of all other H. C. Smith rock bits: triple bearing construction of the cones; ball thrust and roller annular bearings for longer wear and to maintain accurate gage and straight hole. Single-piece alloy steel body is heat treated for maximum strength. Teeth are hard surfaced with tungsten carbide for maximum service life. *H. C. Smith Oil Tool Co.*

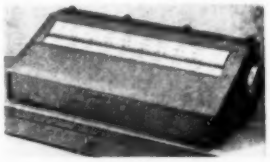
IT'S NEW CHECK IT

34 HIGH-PRESSURE EXPANSION JOINTS. For axial, offset, and radial motion control in high-pressure piping systems. These units for the 1,000-psi. working pressure range have been used successfully in critical confidential projects during the last several years. Joints consist of corrugated, bellows-type sections of stainless steel or other alloys formed within integral control rings and end sections. Available with single or multiple plies and may be lined or unlined depending on application. Sizes begin at $\frac{5}{8}$-in. i.d. and continue through the range of extra-high-pressure pipe sizes. Temperature range is from subzero to 1,400° F. for stainless steel. This upper limit can be exceeded with the use of special alloys. Working pressures of 1,000 psi. have been set up as a base standard. Actually, units have been designed for pressure well in excess of that figure. *Chicago Metal Hose Corp.*



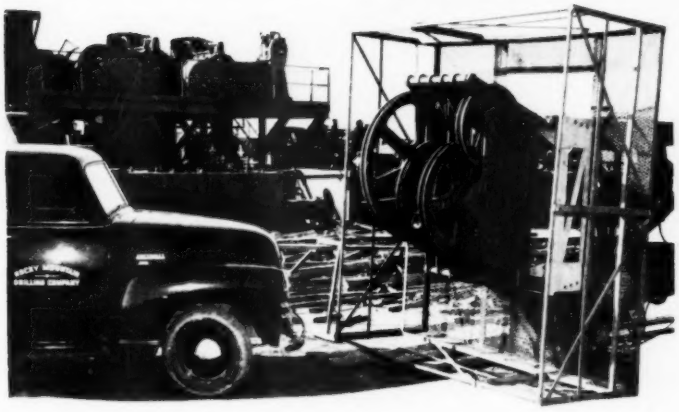
IT'S NEW CHECK IT

35 ROLLO-GUIDE provides a simple means of determining the proper temperature coefficient for correcting petroleum oils to the volume at 60° F. Simply by twisting the knob any desired factor from 0 to 499° F. is exposed, covering the entire seven groups of gravities up to 99.9 A.P.I. Use of this small, attractive desk device will reduce to a minimum the costly errors occasioned by selecting the wrong temperature factors. *Rollo-Guide Co.*



IT'S NEW CHECK IT

REGAN PORTABLE CROWN BLOCKS NOW BEING USED BY ROCKY MOUNTAIN DRILLING COMPANY



- *Fits any portable rig water table without alteration.*
- *Can be mounted in 30 minutes or less.*
- *Even spacing of sheaves insures minimum fleet angle of wire line.*
- *Increased diameter of sheaves provides longer wire line life.*
- *Dual bearings-Regan rotating type throughout.*
- *30-inch diameter Deadline Sheave.*
- *48-inch diameter Fastline Sheave.*
- *Opional Sand and Catline Sheaves mounted integral with crown block.*

In order to provide operators with maximum drilling efficiency, faster and at appreciable savings, Rocky Mountain Drilling Company is now rebuilding its present rigs into completely unitized drilling equipment. The fact that this progressive company is using Regan portable crown blocks in their unitizing program is convincing proof of the adaptability and all-around efficiency of this outstanding Regan product.

No replacements or alterations are necessary to install a Regan portable crown block on any standard-make portable rig. The frame of the block is drilled with matching holes for bolting down to any water table in a matter of minutes. Built to rigid Regan standards, no other portable crown block gives you so many special features and such compact strength. Designed as a companion, the Regan 36-200-ton traveling block provides plenty of weight for free-falling, speeds up drilling operations. Call or write your nearest Regan representative today for more detailed information.

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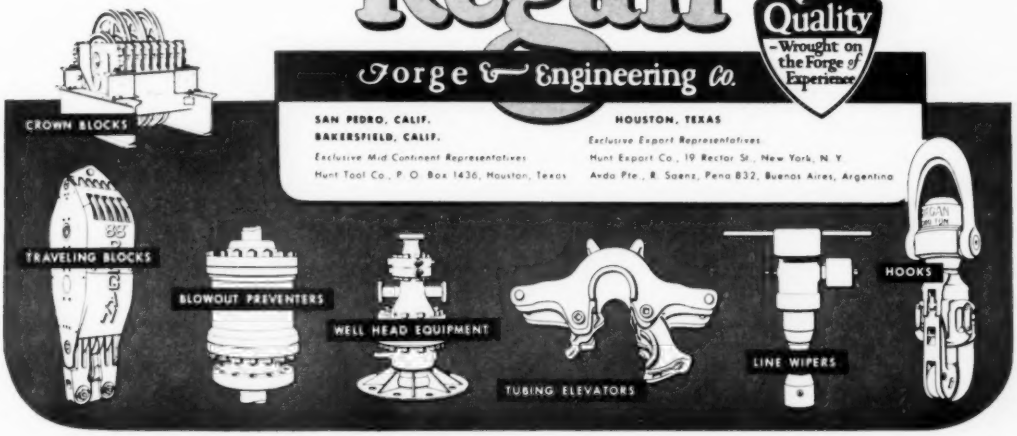

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ARE A DANGEROUS
Fire Hazard
AROUND REFINERIES
AND STORAGE TANKS

Kill them with

ATLAS "A" WEED KILLER

Mowing and hand weeding are slow, laborious, temporary. But Atlas "A" . . . easily and quickly applied as spray . . . kills many species of weeds and grass . . . usually preventing regrowth for an entire season. Atlas "A" is a sodium arsenite solution. It is non-inflammable and non-explosive.

Keep grounds weed-free this season with Atlas "A". Best results follow early application. Now is the time to get Atlas "A".

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REFINING

Work to Begin in May On Hawaiian Refinery

CONSTRUCTION work on the first refinery to be built in the Hawaiian Islands will begin in May, when substantially all major equipment for a 3,000-bbl. plant of Pacific Refiners, Ltd., will arrive by ship from Houston. Fabrication has been under way in the Houston area the past several months for most of the plant's equipment *(The Oil and Gas Journal, January 5, 1950, page 89)*.

Preliminary arrangements are being handled by C. B. Ames of Fish Engineering Corp. who will go from Houston to Honolulu about April 1. Design and construction of this unique plant is being handled as a turnkey job by Fish Engineering. According to R. C. Fish, president, this refinery undertaking makes it possible to procure economies obtainable through processing relatively low-cost crude for needs of the Hawaiian Islands. Petroleum products otherwise now available there are of high cost.

The "synthetic crude" to serve as the normal charging stock for the plant is to be shipped in tankers by Standard Oil Co. of California. This crude oil will be obtained by taking a heavy asphalt-base crude oil, or a reduced crude oil, and blending it with approximately 6 per cent by volume of butane. Material shipped to Honolulu will be refined there to produce butane, gas oil and asphalt.

Pacific Refiners, Ltd., has contracted with Standard Oil Co. of California both for the purchase of charging stock and for the sale to Standard of California of its requirements of asphaltic products for resale in the Hawaiian Islands.

The pressure butane-stripper fractionating tower will be equipped with a side-stream stripper for removal and fractionation of any naphtha in the charging stock. Butane-free bottoms will pass through a heater to an asphalt fractionating column to operate under vacuum where a gas oil will be removed as a side stream. The gas oil will be used as manufactured-gas plant charging stock by Honolulu Gas Co. and as cut-back for road oil. Bottoms from the vacuum column will be specification asphalt. The asphalt column will also be equipped with a second side-stream stripper for removal of diesel oil, if and when the stock contains such a cut.

WORLD'S LARGEST LUBE PLANT.—Above is part of the world's largest lubricating oil manufacturing plant—The Texas Co.'s Port Arthur Works. It is capable of producing 18,000 bbl. per day of finished lubes of all types. Recently added to the plant were a 40,000-bbl. vacuum distillation unit, a 6,500 bbl. M.E.K. benzol solvent dewaxing unit, and a 4,500 bbl. furfural refining unit.

Shamrock to Install New Houdriflow Unit at McKee

A new Houdriflow catalytic cracking unit will be installed by Shamrock Oil & Gas Corp. at its McKee refinery near Sunray, Tex., according to J. H. Dunn, president, and Brig. Gen. D. N. Hauseman, Houdry Process Corp. president.

The new unit will have a design fresh-charge capacity of 5,900 bbl. per stream day, with additional capacity to permit recycling for increased gasoline production.

Construction of the new unit will be handled by Catalytic Construction Co., Philadelphia, and work will get under way immediately, the announcement said. Completion is expected by early 1951.

Present crude charge capacity at the refinery is 7,500 bbl. daily. Thermal cracking capacity is 4,000 bbl.

Esso's New M.E.K. Unit at Bayonne Undergoing Tests

Esso Standard Oil Co.'s new M.E.K. solvent dewaxing plant, which was completed at the Bayonne, N. J., refinery March 3, is now undergoing test runs, and full-scale production will be under way within 30 days.

The unit, with an output capacity of 6,000 bbl. daily, was constructed by the firm of E. B. Badger & Sons Co. Work began in August 1948 as a part of a general modernization program at the Bayonne refinery.

Representing a substantial advance in this type of processing which up to the present time had separated wax from oil in presses, the new plant dewaxes by an automatic, continuous-type operation. A mixture of methyl-ethylketone, benzene, and toluene is employed to lower viscosity of the waxy feed stock and to aid in improving wax separation from oil. The mixture is then chilled and fed to rotary filters for actual wax separation.

Twenty-seven such units are now in operation throughout the world, and 24 more are currently under construction.

Analyses of Foreign Crude Oils Published by Bureau

Foreign production of crude petroleum has jumped to a total of more than 1,000,000,000 bbl. a year in three widely separated areas, the Bureau of Mines said in releasing a publication giving the results of crude-oil analyses from fields in the Middle East, South America, and Canada.

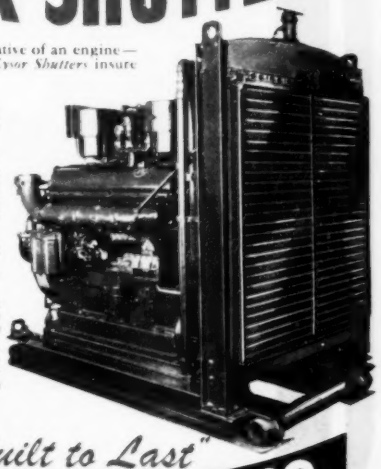
In the Middle East, including Iran Iraq, and Saudi Arabia, crude-oil production rose to 417,201,000 bbl. in 1948—a 39 per cent increase over the 1946 production, according to the publication. In South America, including Colombia, Peru, and Venezuela crude-oil production reached 574,837,000 bbl. in 1948—23 per cent more than in 1946. Discovery of the Leduc field in 1947 and the Redwater field in 1948 also skyrocketed crude-oil production in Canada, the report points out. In 1947, Canadian oil fields yielded 7,726,876 bbl., and in 1948—12,370,875 bbl.

At Bartlesville, Okla., bureau petroleum chemists analyzed 35 crude-oil samples from fields in these seven countries and Chile. The publication includes a table showing fields by country, year of discovery, and production for 1948. Other tables present a breakdown of the general characteristics of the oil samples, including the percentage of gasoline and naphtha in samples, and a list of, as well as, a bibliography for all analyses of foreign crude oils published by the bureau.

The publication, Report of Investigations 4657, "Analyses of Some Crude Oils From the Middle East, South America, and Canada," was prepared by O. C. Blade and E. L. Garton, bureau petroleum chemists, and C. M. McKinney, bureau chemical engineer, all three stationed at Bartlesville.

A free copy of the publication may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

How to Preserve
the Long Life of Your Engine
and Save it from Cylinder Wall Wear, Sludge, Shutdowns and High Fuel Consumption *By Using*
KYSOR SHUTTERS



Heat is the greatest preservative of an engine—if it's properly regulated. *Kysor Shutters* insure **Temperature Control.**

The higher the temperature, the less amount of wear on the cylinder wall!

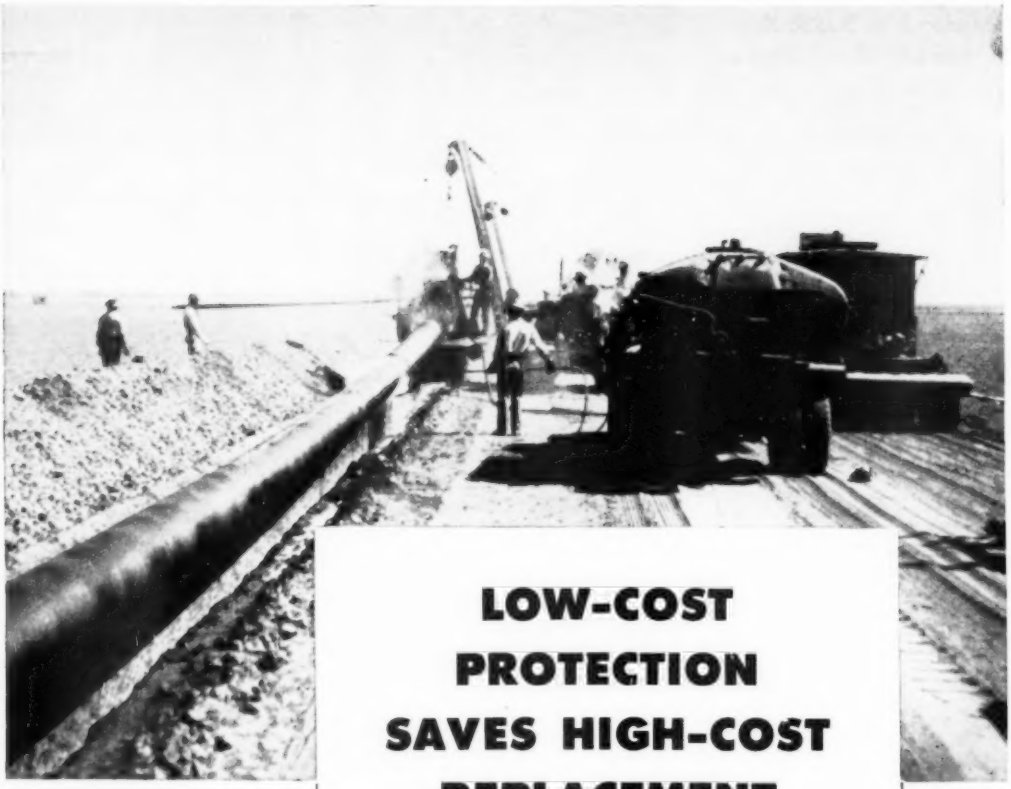
And uniform high heat prevents sludge and there are fewer breakdowns! Less oil is required and there is actually a *savings of 8% to 12% on fuel!*

Kysor Shutters maintain the proper temperature at all times by means of automatic air or vacuum controls.

You can easily install a **Kysor** Shutter on your old or new engine, *or specify it from your manufacturer.* PRESERVE THE LONG LIFE OF YOUR ENGINE AND SAVE TIME AND MONEY BESIDES!

Write for Bulletin!

"Built to Last"
KYSOR HEATER CO.
CADILLAC, MICHIGAN



LOW-COST PROTECTION SAVES HIGH-COST REPLACEMENT

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PIPE LINES

Transcontinental Decision By FPC Appears Imminent

Federal Power Commission's decision on whether or not it will grant Transcontinental Gas Pipe Line Corp. permission to expand capacity of its Texas-to-New York City natural-gas pipe line, and South Jersey Gas Co.'s application to build pipe-line facilities in New Jersey to receive gas from Transcontinental, appears to be imminent. The commission has ordered intermediate decision procedure omitted and has sent the applications directly to the presiding examiner for decision.

Transcontinental is proposing to increase the capacity of its Texas-New York City pipe line, now nearing completion, by 165,000,000 cu. ft. per day to a new total of 505,000,000 cu. ft. South Jersey is seeking authorization to build 77 miles of line designed to carry about 30,000,000 cu. ft. daily. The company plans to receive about 18,000,000 cu. ft. from Transcontinental in the first year of operation

Action was requested by both applicants. Transcontinental said that it needed the authorization early in 1950 in order to carry through its integrated construction program, to avoid delays, to take advantage of favorable prices for pipe and compressor station engines, and to satisfy the requirements of its contracts with existing and proposed new customers.

South Jersey said that unless it receives necessary authorization for its project by April 1, it will have to renegotiate its credit agreement and may as a result be required to pay higher interest rates on financing the proposed facilities.

Iroquois Gas Seeking to Build 23-Mile Pipe Line

Iroquois Gas Corp., Buffalo, has asked Federal Power Commission to authorize development of three new underground natural-gas storage fields, to enlarge an existing field, and to build 23 miles of line, all in western New York.

Purpose of the proposed construction and expansion program, which is estimated to cost $2,119,500, is to help the company meet heavy winter peak-day demands. No new markets would be served.

Two of the underground-storage pools which the company plans to develop are located in Erie County, one near Wales and Holland, and the other in the Evans area. The third new field is in the vicinity of Bennington in Wyoming County. The existing field which the company proposes to enlarge is the Collins storage field, at Collins, in Erie County.

Iroquois said the proposed 23 miles of pipe would supplement existing transmission lines in moving storage gas to and from the proposed Holland and Bennington fields.

Texas Illinois Gas' Line To Be Started by October

Construction on Texas Illinois Natural Gas Pipe Line Co.'s 1,254-mile Texas-to-Illinois gas line will get under way by October. The 30-in. line will originate near Houston, and will be laid to the vicinity of Joliet, Ill., at a cost of between $140,000,000 and $150,000,000.

Texas Illinois, a wholly owned subsidiary of Peoples Gas Light & Coke Co., expects to complete the line by November 1951. Original capacity will be 340,000,000 cu. ft. daily, and may later be enlarged to 500,000,000 cu. ft. daily. Contracts assuring a minimum supply of 300,000,000 cu. ft. daily for the line have been arranged.

Peoples Gas also owns Natural Gas Pipeline Co. of America, which operates two parallel lines from the Hugoton gas field to Chicago.

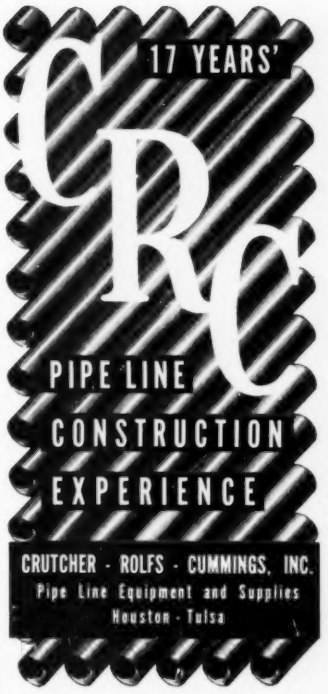
Less to Be Spent on Pipe Lines This Year—Peck

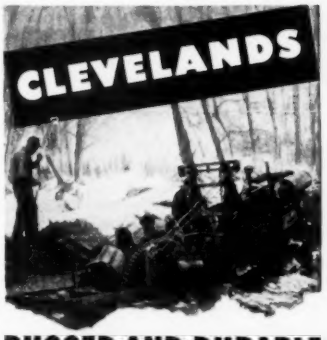
While some high-pressure pipe line and underground storage projects are scheduled, their size and scope do not require the tremendous investment of former years, Irving K. Peck, vice president and general manager of Manufacturers Light & Heat Co., announced last week in outlining the company's construction plans.

Irving said that the $10,000,000 1950 budget of his firm, and associated companies in the Pittsburgh group of Columbia Gas System, Inc., calls for the investment to be spread over the six states where a natural-gas service is supplied to some 408,000 customers in over 700 communities.

Included in the budget will be appropriations for expansion of short-wave radio sending and receiving stations along the pipe-line system.

"Our current major job is to invest over $5,000,000 to modernize and expand those gas-distribution facilities which more directly serve our residential, commercial, and industrial customers," Peck said.





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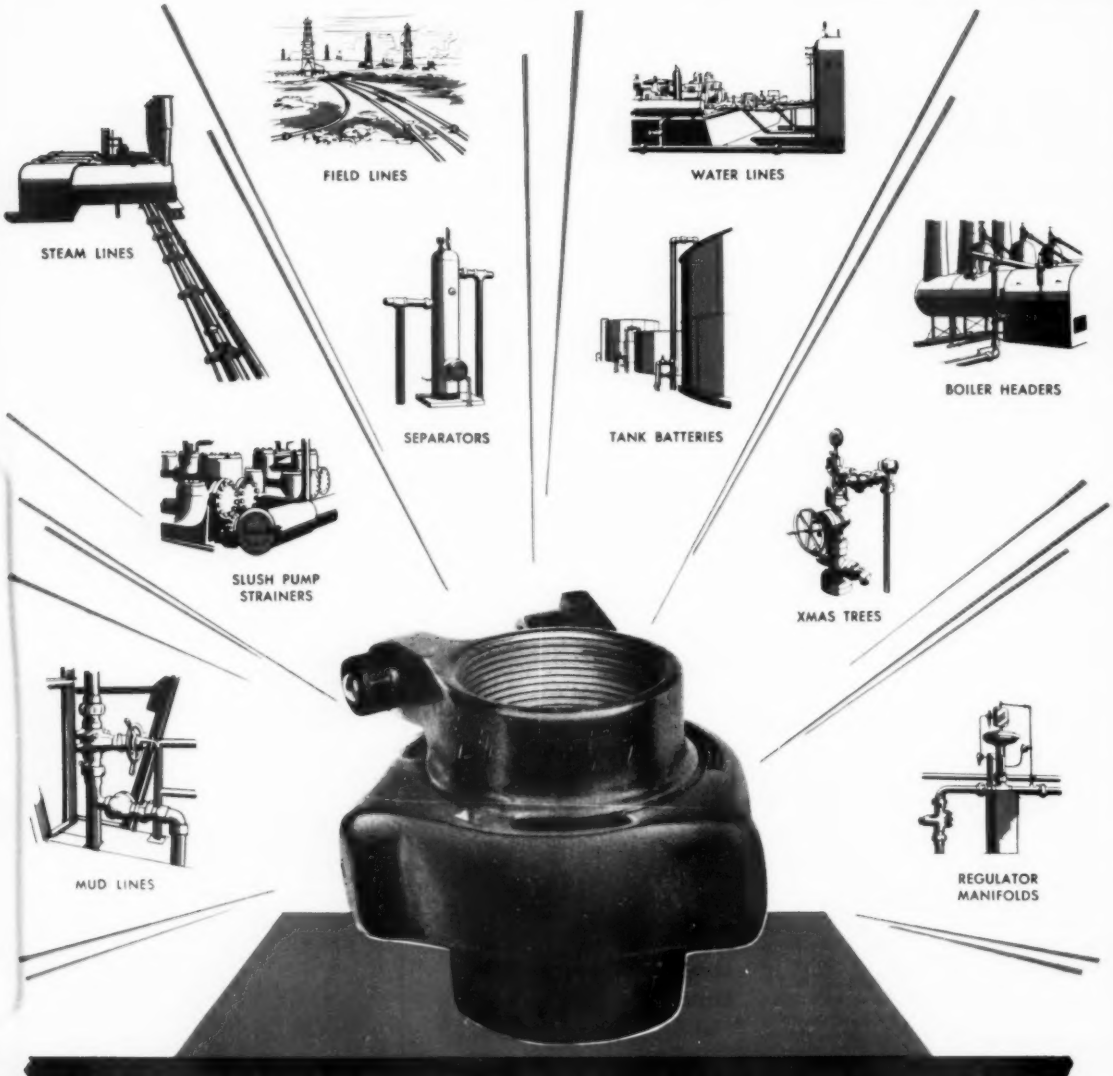

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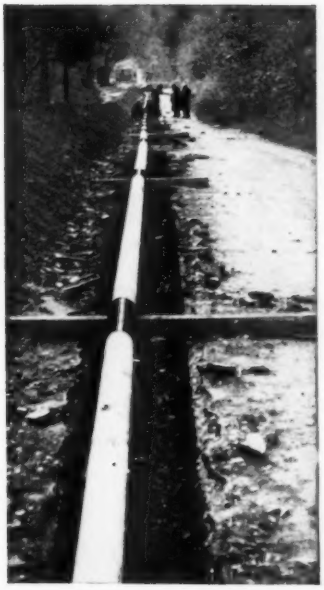

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ICC Reports Continued Decline in Line Traffic

Continued decline in total volume of traffic in pipe lines of 46 United States companies was reported by the Interstate Commerce Commission for the fourth quarter of 1949, compared with the same quarter in 1948. At the same time, however, transportation revenues showed an increase.

Total transportation revenues of the 46 companies carried in the report was $91,241,092, compared with $90,269,045 the same quarter in 1948. This revenue was earned for transportation of 594,885,774 bbl. of oil, compared with 669,202,595 bbl. in the fourth quarter of 1948.

Company moving the most oil during the quarter was Humble Pipe Line Co., which transported 57,120,649 bbl. This compares with 75,464,651 bbl. the same quarter in 1948.

Stanolind Pipe Line Co. earned the most in transportation revenue. It took in $10,406,806 for transporting 34,283,259 bbl. of oil. This compares with earnings of $9,295,946 the same quarter in 1948, for transporting 39,927,521 bbl. of oil.

Texas Gas' Expansion Will Be Completed This Year

With the construction of a 32-mile lateral line from Slaughters, Ky., to Evansville, Ind., and four compressor stations with a total horsepower rating of 28,080, Texas Gas Transmission Corp. this year will complete its current $73,500,000 expansion program designed to bring the firm's total daily delivery capacity of natural gas to over 600,000,000 cu. ft.

Designs are now being completed and orders placed for the four remaining compressor stations. The 32-mile lateral will be constructed to supplement supplies to the Indiana and Illinois portion of the system, and a 9-mile line will be built in the Carthage, Tex., gas field.

United Gas Planning Huge Expenditures on Expansion

Nearly $36,000,000 will be spent by United Gas Companies in 1950 to expand and improve facilities in the gulf states, N. C. McGowen, president, reported last week.

United Gas Pipe Line Co., the transmission subsidiary, will spend $22,000,000 during the year on new construction. Approximately $2,000,000 will go into gathering lines and equipment to the additional gas fields into the pipe-line system, and about $17,500,000 is scheduled for construction of new lines to communities and industries not presently served, and to increase capacity of existing lines. Plants for production of nat-

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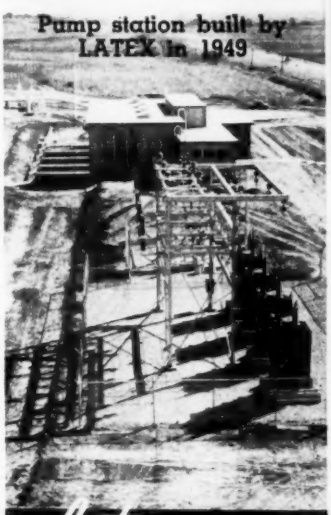
Pump station built by LATEX in 1949



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ural gasoline and other liquid hydrocarbons from natural gas, expansion of compressor stations, and other facilities will take the remainder of the construction budget.

McGowen said that United Gas invested more than $36,000,000 in extensions of service and development of oil and gas fields in 1949, and this year's construction budget will bring the total spent on similar projects since 1930 to more than $300,000,000.

Two-Way Radio Used to Test Michigan-Wisconsin Line

A new and economic application of two-way FM mobile radiotelephone for use in the construction and testing of natural-gas pipe lines, was recently put into practice during the building of Michigan-Wisconsin Pipe Line Co.'s line which will supply natural gas from Texas to Michigan and Wisconsin.

Use of two-way radio communication, which directly controls the cleaning and testing operations of newly laid pipe, has been made possible by the installation of a "three-point" radio network of FM mobile equipment manufactured by Federal Telephone and Radio Corp., Clifton, N. J., associate of Internation Telephone and Telegraph Corp. Unlike most standard two-way radio systems, this equipment operates in a mobile-to-mobile hookup by using two radio-equipped vehicles as mobile "ground stations" and an airplane flowing over the pipe line acting as the "central station."

As the cleaning and testing activities of a new pipe line are carried out, the air-to-ground mobile communication system becomes the key to safer, faster and more efficient operations.

The "central station" radio equipment is mounted in the fuselage of the plane, with the radio-control unit mounted on the dashboard in the cockpit. From this position the pilot can visually survey the ground below and give out information via the radio system. The other two mobile units are installed in vehicles located at each end of the section of pipe being tested. As the pig is forced through the pipe, the plane travels low over the line in the same direction as the pig and consequently all three radio positions can move along the route as the operation is extended from one length of pipe line to another.

If anything should occur, such as an occasional break in the pipe, a fire, or any other unusual condition which can be seen from the air, the ground test positions are notified via the plane's radio. Instructions can be given to close valves, increase or decrease pressure, or any other information pertinent to providing safer, faster and more efficient test operations.

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PIPE CUTTING AND BEVELING MACHINE

EQUIPPED WITH OUT-OF-ROUND ATTACHMENT.

Machines to cut and bevel 16" pipe and over are furnished with out-of-round attachment. Machines to cut and bevel 14" pipe and under are furnished with standard torch holder.

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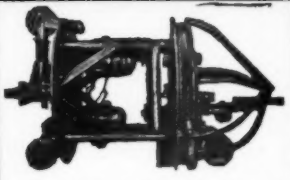
ELECTRIC MODEL INTERNAL LINE-UP CLAMP



The electric model shown above is a rugged, heavy-duty clamp, electrically operated for the tough jobs.

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Better stringer bead; better finish weld; better pipe line.

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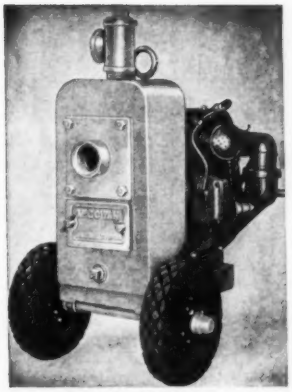

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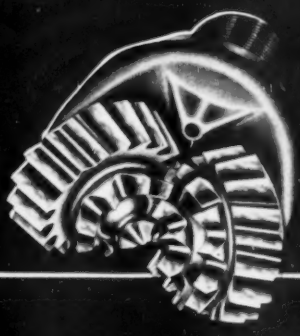

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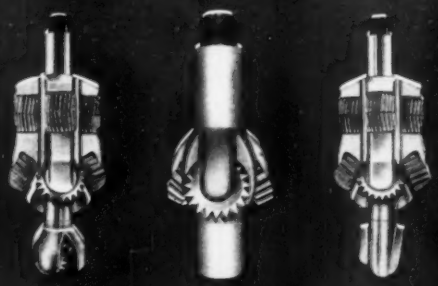

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3-POINT HOLE OPENER

6-POINT HOLE OPENER WITH BULL NOSE PILOT

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Decrease Again Reported In Survey of Active Rigs

Rotary rigs operating in the United States and western Canada during the week ended March 20 (latest report) totaled 2,009, a decline of 29 from the number reported the previous week. Declines in drilling activity were reported in all areas except Oklahoma, the Rocky Mountains and western Canada, and place the total number of rigs at the level it was a month ago. The total was 119 under what it was a year ago. The number of operating rigs by areas follows:

ROTARY RIGS IN OPERATION*

(United States and Western Canada)

Area	Week ended 3-20-50	Change week ended 3-13-50	Change week ended 3-21-49
Gulf Coast	483	— 8	—114
W. Tex.-N. M.	686	—12	+ 122
Ark.-N. La.-E. Tex.	128	— 3	— 19
Oklahoma	256	+ 5	— 23
Kansas	116	—10	+ 19
Illinois-Eastern	76	— 5	— 11
Rocky Mountains	65	+ 2	— 31
Pacific Coast	121	— 5	— 60
Total U. S.	1,931	—36	—117
Western Canada	78	+ 7	— 2
Total	2,009	—29	—119

*Courtesy Hughes Tool Co.

Nichols-Duncan Drilling Co., Duncan, Okla., has the contract for a 6,500-ft. wildcat test which Herman L. Hurst of Oklahoma City is starting in southwestern Grant County, northern Oklahoma. The test is 1 Barr in 31-26n-7w.

Longhorn Drilling Corp., Three Rivers, Tex., has the contract to drill Western Natural Gas Co. 1-A Jesus Cardenas, a projected 8,600-ft. well in the San Salvador field, Hidalgo County, Rio Grande Valley area, Lower Texas Gulf Coast. Location is in Block 154, San Salvador del Tule Grant. Clem Nolan will be the toolpusher.

Keyes, Marken & Grannell are the contractors for Phillips Petroleum Co. on a well being drilled in the Pondera area, Pondera County, Montana. The well, 4 Walston, is in 2-27n-4w.

Paul Guthrie Development, Ltd., Edmonton, Alta., Canada, a recently incorporated drilling company, has been awarded a contract to drill A. G. Bailey Co. and associates' second test in the Spedden area, 75 miles northeast of Edmonton. The location, in LSD 7, 33-59n-13w4th, is about 2½ miles southwest of the latter operators' first test, which found gas production in Lower Cretaceous sands.

Delaney Opens Tyler Office

M. J. Delaney Co., Dallas, has announced the opening of district offices at Tyler, East Texas. They are located in the New Fair Foundation Building, where Roy Connally, drilling superintendent for the company, will have headquarters. The company now has six large rotary rigs running in the Tyler area.

Mitchell & Gage Drilling Corp., Oklahoma City, has contracted with Ashland Oil & Refining Co. for a wildcat test to be drilled 2 miles east of Zion, Logan County, Oklahoma. The test is 1 Adams, 29-17n-4w. Hole is projected to 7,100 ft.

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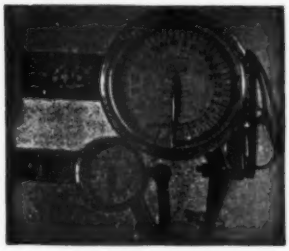
LINE SCALES



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for a look at the second Wilcox sand. Location is about 1½ miles from nearest production in the Crescent pool.

Can-Tex Drilling Co., Calgary, is moving in rotary tools to drill another exploratory test for Bear Oil Co., Ltd., in the Athabaska area, about 85 miles northeast of Edmonton, Alta., Canada. The new location, 1 Brandi, LSD 9, 23-66n-22w4th, is about 2½ miles south of the first test, a dry hole, drilled last year.

Brewster-Bartle Drilling Co., Houston, has the contract to drill Atlantic Refining Co. 2-A Sabine Lumber Co., in the North Bancroft field, Beauregard Parish, Louisiana Gulf Coast. Projected depth is 12,000 ft. Location is in 23-5s-13w.

Delta Drilling Co., Tyler, Tex., is drilling a deep test for Humble Oil & Refining Co. in the Red Lake field, Freestone County, East Texas. Location is on the Ball Estate lease in the J. Y. Aguilera Survey.

Gracey Drilling Co., Houston, is drilling for Union Oil Co. of California at 2 State, a projected 12,000-ft. test in the South Tigre Lagoon field, Iberia Parish, coastal Louisiana. Location is in 22-14s-5e.

Milton Crowe, Shreveport, is drilling a test in the Big Island field, Rapides Parish, Louisiana, for Union Production Co. and M. H. Marr et al. Test is 1 Bell, 2-4n-3e, and is scheduled to be drilled to 5,700 ft.

R. C. Patton Co., Wichita, is starting a contracted wildcat test for Champlin Refining Co. at 1 Stumph-Smith, 12-32-15, Barber County, Kansas. The location is about 1½ miles northeast of the Deerhead pool and 3 miles southwest of the South Skinner gas pool.

Kingery Brothers, Inc., St. Jo, Tex., is the contractor in a prospective oil discovery well in eastern Payne County, Oklahoma. The well (1 Davenport), which is being drilled for Thomas N. Berry & Co., was projected to 3,000 ft. but found good oil and gas showings in a shallow sand at 1,868-76 ft., and casing has been cemented for testing. The location, in 34-18n-6e, is 4 miles west of Drumright and about 3 miles west of the Cushing field.

J. C. Chance Well Service Co., Beaumont, Tex., is the contractor on a new test being started by Sun Oil Co. at 1 Sun Fee in the DeQuincy field, Calcasieu Parish, Louisiana Gulf Coast. Location is in 1-8s-11w. Hole is projected to 7,400 ft.

Goldrus Drilling Co., Houston, has spudded a projected 6,500-ft. wildcat test on the northwest flank of the Sour Lake dome, Hardin County, Texas Gulf Coast. The well is 1 Minor Oil Co., and is Goldrus's own venture.

Roeser & Pendleton, Inc., Fort Worth, is drilling a projected 12,000-ft. test for Atlantic Refining Co. in the North Bancroft field, Beauregard Parish, coastal Louisiana. The test is 1 Browning in 24-5s-13w.

Noble Drilling Co., Tulsa, has been given the contract for a projected 8,000-ft. wildcat test which Ohio Oil Co. will drill in eastern Coal County, southern Oklahoma. Location, in 35-3n-11e, is on the Jones lease in the center of a large block held by Ohio and is about 2 miles southwest of the shallow gas-producing South Ashland pool.

York Oil Field Service, Inc., Houston, is drilling Pollard Simons Oil Co. 1 Moore, 26-9s-11w, a 3,300-ft. test in the Edgerly field, Calcasieu Parish, Louisiana Gulf Coast.

Don R. Johnston Drilling Co. has the contract for a wildcat test which Kingwood Oil Co. is starting southwest of the Ramsey pool and north of the Coyle area in Payne County, Oklahoma. Location of the test, 1 Murphy, is in 27-18n-1e.

Pacific Drilling Co., Long Beach, Calif., has a rig running for C. D. Howe at 1 Downs, a recently started test in the Carbon Canyon area, San Bernardino County, California. Location is in 31-2s-8w.

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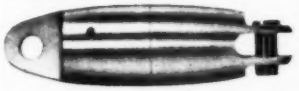

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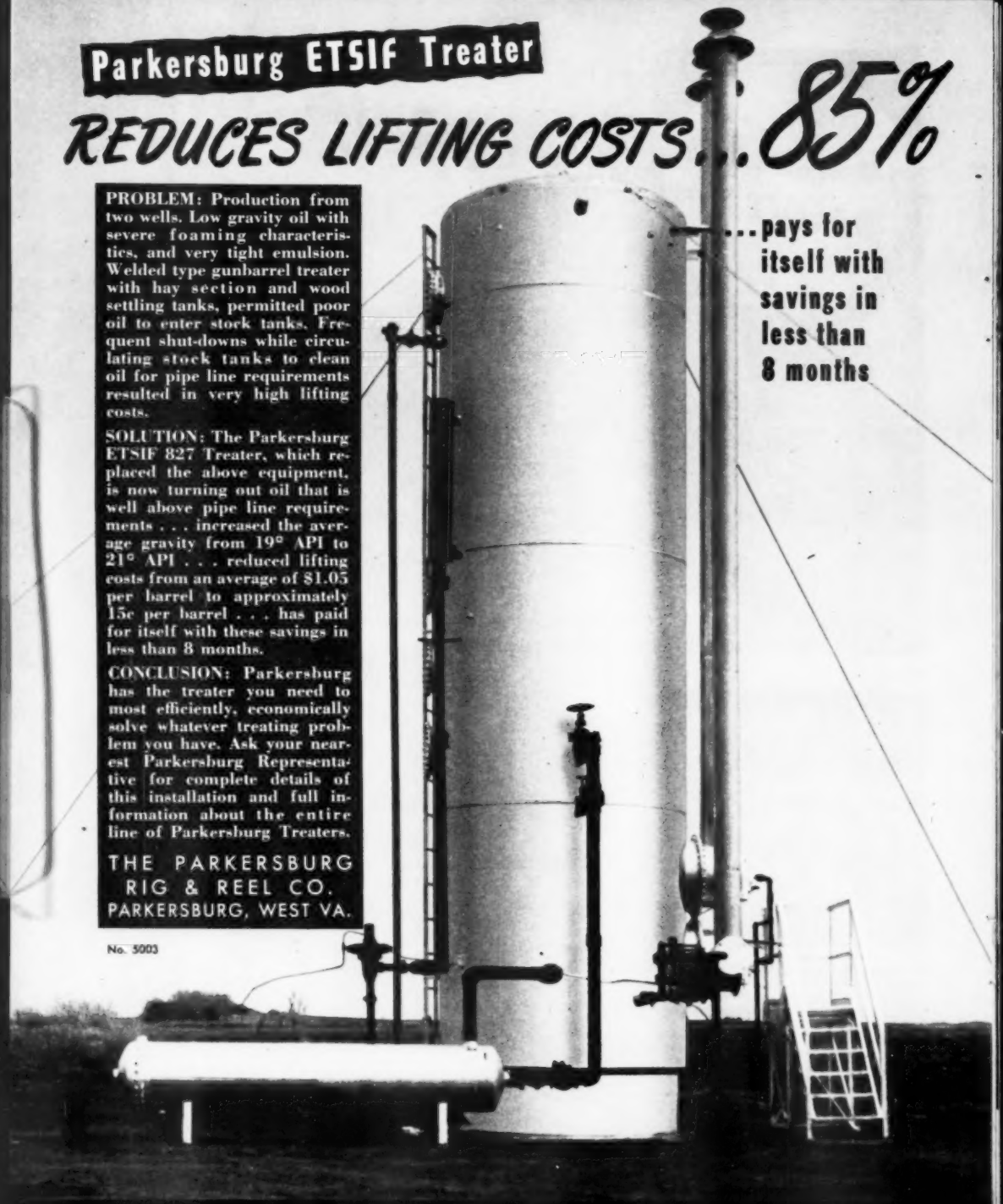

PARKERSBURG

NATURAL GAS

Illinois Orders Inquiry Into Peoples' Rate Charges

An investigation of all rate schedules of Peoples Gas Light & Coke Co. was ordered last week by the Illinois Commerce Commission, which will probably rule out any immediate commission action on the company's petition to increase rates of natural gas to users of interruptible and off-peak service.

The commission will study the rates apart from its hearing on the off-peak petition, however.

One of the major questions to be taken up by the commission is the cost of a new pipe line from the Texas Gulf to Chicago, which will be completed for the heating season of 1951-52. Peoples Gas said residential rates will have to be raised at that time because the new gas supply will cost 2½ times as much as present natural gas.

The pending hearing is for a 30 per cent increase in rates of 526 off-peak and 8 interruptible customers. If granted, the increases would amount to an additional $1,800,000 per year in revenues for the company.

Panhandle Outlines Plans To Expand Gas Supply

Plans to expand its natural-gas supply by 300,000,000 cu. ft. daily were outlined before Federal Power Commission at a hearing in Washington, D. C., last week by Panhandle Eastern Pipeline Co. The additional gas would be sold mainly in the Midwest.

Robert P. Patterson, chief attorney for Panhandle and former secretary of War, said the company's expansion would raise its daily supply to 800,000,000 cu. ft. Panhandle Eastern would get 250,000,000 cu. ft. of the extra gas by buying the entire delivery from a proposed new $80,000,000 Louisiana-to-Illinois natural-gas pipe line which Trunkline Gas Supply Co. is seeking to construct.

The other 50,000,000 cu. ft. of gas would be obtained by expansion of Panhandle's existing facilities in the Hugoton-Panhandle gas field in Kansas, Oklahoma, and Texas. The additional gas would go to Michigan, Ohio, the City of Indianapolis, and to Canadian customers.

Panhandle has applied to FPC for authority to export gas to Canadian customers through Union Gas Co. of Canada, Ltd., under a written contract between the two firms. The gas would come in part from Panhandle's own reserves, and would be delivered through additional line capacity. An annual export of 27,350,000,000 cu. ft. is proposed, at a daily rate of between 37,500,000 and 100,000,000 cu. ft., at a base price of 27.5 cents per M.c.f.

Gas-Measurement Short Course Set April 11-13

The program has been completed for the twenty-fifth Southwestern Gas Measurement Short Course, which will be held at the University of Oklahoma, Norman, April 11-13. Sponsored by the College of Engineering of the university, the three-day meeting will offer studies on gas laws and their use in measurement, gas accounting, maintenance, and other topics pertinent to the gas industry.

J. H. Russell, vice president, Gulf Oil Corp., will make the principal address on April 11, following a talk on the aims and operation of the gas-measurement short course, by W. H. Carson, dean of the College of Engineering. Among papers to be prepared are the following:

"Gas Regulation at Extremely High Pressure," by W. A. Shellshear, Gulf Oil Corp.; "Predictions of Gas Temperatures in Buried Pipe Lines," by Laurance S. Reid, University of Oklahoma; "Determination of Gasoline Content of Gas," by Gordon Tillman, Tide Water Associated Oil Co.; "Prevention of Freezing in Measuring and Regulating Equipment," by Mark A. Hardie, Michigan-Wisconsin Pipe Line Co.; "Determination of Leakage and Unaccounted-For Gas in Distribution Systems," by P. J. Conner, New Orleans Public Service, Inc.

"Dehydration of Gas at Well Head," by Laurance S. Reid, University of Oklahoma; "Fundamental Principles of Orifice Meters," by D. C. Wiley, American Meter Co., Inc.; "Orifice Fittings for Measurement of Natural Gas," by Gordon Z. Greene, Commercial Iron Works; and "Explanation of Retrograde Condensate in Gas Condensate Reservoirs," by Dr. R. L. Huntington, University of Oklahoma.

One of Biggest Increases in Rates Sought by El Paso

El Paso Natural Gas Co. has applied to Federal Power Commission for an increase in its rate applicable to wholesale service to Southern California Gas Co. and Southern Counties Gas Co. of California which would amount to approximately $2,465,000 annually or 12 per cent, based on anticipated sales for the 12-month period ending April 30, 1951. This is one of the largest rate increases ever proposed to the commission by a gas-utility company.

El Paso Natural said that the proposed increase in rate is urgently needed to obtain a reasonable return on deliveries to Southern California Gas Co. and Southern Counties Gas Co. Paul Kayser, president of the company, said that increases in the cost of purchased gas, wage increases, and increases in cost of pipe-line materials are the reasons for this rate increase proposal.

Natural Gasoline

Tennessee Gas to Build Gasoline Plant in Kentucky

HOUSTON.—Plans are under way to build a $12,000,000 gasoline plant and a $25,000,000 chemical plant along the western Kentucky segment of the gas pipe line of Tennessee Gas Transmission Co.

Gardiner Symonds, president of Tennesse Gas, disclosed the plans at the company's annual stockholders' meeting here. He said the extraction plant, which his company will build, will lower the B.t.u. content of the gas in the line from 1,048 to 1,033. Symonds added that operation will remove some of the heavier hydrocarbons which have proved objectional to the firm's industrial consumers, and provide a byproduct income also.

The large chemical plant will be built by the newly organized Mathieson Hydrocarbon Chemical Corp., a subsidiary of Mathieson Chemical Co. It is not known what products the plant will manufacture.

Symonds said that the western Kentucky location was selected because of freight-rate advantages. The exact location of the new plants has not been announced.

Superior Plans to Build Plant on Texas Gulf Coast

HOUSTON. — Pending approval from the Federal Power Commission regarding sale of residue gas, Superior Oil Co. plans to build a $1,500,000 gasoline plant in Altair field, Colorado County, Texas Gulf Coast.

Bids have been invited on a plant with a capacity to handle between 50,000 and 70,000 M.c.f. of gas daily, according to S. F. Magor, vice president in charge of manufacturing.

Union Operating Plant

Union Oil Co. of California on March 1 became operator of a gasoline plant in the Coalinga-Nose field of Fresno County, California, formerly operated by Robert S. Lytle. The plant has a gas-processing capacity of 25,000,000 cu. ft. per day, and a liquid production capacity of 42,000 gal. daily of natural gasoline and liquefied petroleum products.

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Exploration and Drilling

West Texas Reefs Jump West and South

THE hottest oil-exploration spot in the country is getting hotter. The reef oil play in West Texas has two new strikes to evaluate this week, and in a manner that is getting customary by now, they raise new questions instead of throwing too much light on the old problems. Outsiders might wonder who cares about the questions, as long as oil is found. But to individual operators and companies, the right answer or right guess means the difference as to WHO finds the oil. To individual companies or operators, the right answer or right guess may mean millions in profit.

The first strike is Barnsdall Oil Co. 1 Wilson, NE NE Section 16, Block 27, H&TC Survey, along the south line of Borden County. It lies about halfway between the George P. Livermore, Inc., 1 Reinecke well to the east in Section 53, Block 25, H&TC, and Vealmoor field to the west. The Barnsdall strike is on a block of over 6,000 acres in which Barnsdall acquired a half interest from Pacific Western.

The Barnsdall well topped Canyon reef at 7,410 ft., or —4,928 ft., and drilled in 10 ft. It is alleged that the samples look discouraging, but a drill-stem test was taken as a routine precaution. Result—gas came to the surface in 3 minutes, and oil started flowing in 13 minutes. It was allowed to flow to pits for about 40 minutes at a rate estimated around 15 bbl. per hour. Bottom-hole flowing pressure was 2,600 psi., and shut-in pressure was 3,250 psi. after 10 minutes.

Due to danger of lost circulation, a string of 7-in. was run to total depth and cemented. It is reported that the well will be cored in 15 to 25-ft. intervals below present total depth and drill-stem tests taken until the water level is located.

The second well to draw attention is in a direction that has been quiet for some time: south in northwest Mitchell County. Thomas W. Doswell et al., 1 Solomon, NW NW Section 72, Block 97, H&TC Survey, after being acidized with 5,000 gal., is credited by some observers with flowing to pits at an estimated rate of 40 to 50 bbl. per hour. Flow is from perforations at 7,448-68 ft., in a Pennsylvanian lime. (Elevation and datum not available at time of writing.) This well was drilled to around 7,600 ft. total depth, and developed water in the interval 7,518-7,600 ft.

This well is located about 3 miles southeast of Standard Oil Co. of Texas 1 Dunn, a Strawn (?) discovery of last September. *(See The Oil and Gas Journal, September 29, 1949, page 117.)*

The Doswell strike complicates a lot of things. For one thing, oil men trying to keep up with things popping from Borden County on the west, through Scurry County and north into Kent County were already suffering from the same kind of sore neck tennis spectators develop. Now in addition to the arc from west to north, they are going to have to scan the maps southward at the same time.

Water-oil contact levels certainly mean something as far as a single common reservoir are concerned. So it seems pretty likely that the Barnsdall strike, with a reef top of —4,928 ft., is not connected with the same reservoir as the Amerada Von Roeder area in the eastern corner of Borden County. The water level there is somewhere between —4,542 and —4,567 ft. On the other hand, while there is some doubt about the water level in Sharon Ridge Canyon, across the line in Scurry County, with some estimates putting it higher than in the Von Roeder area, still the prospects of Sharon Ridge connecting up with the Von Roeder area look pretty fair.

Neither is the Barnsdall strike apt to be part of the same reservoir as Vealmoor, to the west, where the water level is around —5,300 ft. Or maybe that ought to be hedged, until we know definitely that the Barnsdall well doesn't have 400 ft. of pay above the water level. Meantime, just to emphasize the uncertainties, last reports on the west offset to the Livermore 1 Reinecke well had it drilling shale at —4,465 ft., or about 60 ft. below where the Reinecke had the reef top. Then remember, too, that Standard Oil Co. of California 1 Griffin, in Section 35, just 2½ miles east of the Barnsdall well, had water at —4,785 ft.

If you want to refresh your memory about some of the theories on reef trends south and west of Scurry County in the early stages of various successful wildcats, check these. *(The Oil and Gas Journal, September 29, 1949, page 117; November 10, 1949, page 397; December 8, 1949, page 113; and February 23, 1950, page 219.)* Then for a sample of what reefs can do, check February 9, 1950, page 115, for some of the things that happened at Golden Spike in Canada.

Charles J. Deegan.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Heard and Heyser 1 Holley, 52-25-H&TC, west offset to Livermore 1 Reinecke, Borden County reef discovery, had a reef top around 6,806 ft., or minus 4,471 ft., which would make it 63 ft. low to the discovery. First drill-stem test of the section was said to have flowed oil, with no details available. Livermore's 1 Whitaker, Section 53, south offset, was still above the reef at 6,450 ft. Ted Weiner 1 Corriker, Kent County test, recovered 5 ft. of slightly gas-cut mud on a 30-minute test of the Strawn at 7,170-7,245 ft. Caroline Hunt 1 Young, Section 166, Block G, set 7-in. casing at 7,235 ft., total depth, in lime and shale. Between that prospect and Cogdell field, Heyser 1 Lohman, 42-G-W&NW, was drilling below 6,360 ft. in shale, with the reef not yet reported.

ROCKY MOUNTAIN AREA.—A new gas discovery is apparent with the recovery of gas on test in the Muddy at British American Oil Production Co.'s Logan County, Colorado, wildcat. Pure Oil Co. is now drilling by whipstock at its Badwater wildcat, Wyoming, below 13,666 ft., and is planning to test the Frontier around 16,000 ft. New drilling is planned for the Lindrith area in the San Juan Basin, New Mexico.

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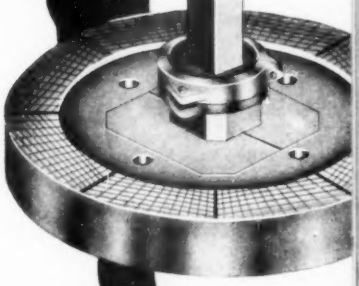

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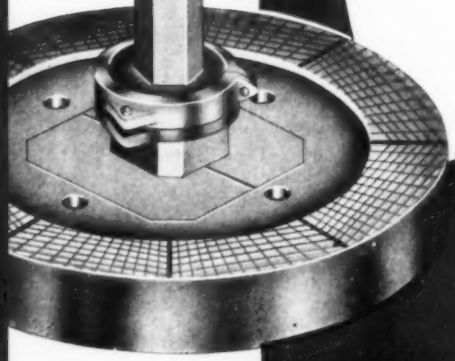

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KANSAS

Ellis County Wildcats Completed as Pumpers

JONES, SHELBURNE & FARMER have established a new producting area in southern Ellis County with the completion of their 1 Campbell, NE NE NE 30-15-17. The well pumped 135 bbl. of oil in 24 hours on potential tests. Production is from Arbuckle lime at a total depth of 3,563 ft. Pay was topped at 3,557 ft. (—1,580 ft.). Hole is open below 3,559 ft. The well, located 4 miles west of Pfeifer, is about a mile south of the Wheatland pool, in which the discovery well, completed last January, found the Arbuckle only 11 ft. higher.

About 8½ miles to the north in the NE NE SE 8-14-17, another wildcat drilled by the same operators has encounteded oil showing in the Arbuckle. This well, located a mile south of the Younger pool, cut this formation at 3,560 ft. (—1,544 ft.). It was drilled to 3,576 ft., and with casing run to 3,562 ft., standard tools are being moved in for testing.

Southern Ellis County is credited with another new pool with the completion by Lindas Oil Co. and Aledo Oil & Gas Co. of their 1 DeChant, SW SW SW 6-15-18. Also producing from the Arbuckle, this well pumped 78 bbl. of net oil, cutting about 80 per cent water, on potential tests. Casing, run through the pay, topped at 3,670 ft. (—1,600 ft.), was perforated at 3,675-77 ft. The discovery located about 1½ miles southeast of the Antonio Townsite pool, opened late last year, has been designated as the DeChant pool.

In Reno County, another discovery well, Cities Service Oil Co. 1 Graber, NW NW NE 14-26-6, a mile north of the Albion pool, has been completed as a Viola lime producer. On a potential test, it pumped 20 bbl. of oil with 180 bbl. of water in 19 hours. Top of the Viola is 3,997 ft. (—2,467 ft.). Casing was perforated opposite the top 5 ft. Hole had been drilled to the Arbuckle, logged at 4,125-66 ft. Casing was run to 4,105 ft. The area will be known as the North Albion pool.

Westgate-Greenland Oil Co. apparently has extended the Bartholomew pool, located on the western edge of Sedgwick County, a half-mile to the south with a Mississippian well at its 1 Davis, NE NW SW 31-27-4. The well flowed 50 bbl. of oil the first hour in starting tests of the pay at 3,701-49 ft.

Testing is under way at Francis Oil & Gas Co. 1 Pywell, SW SW SW 31-9-19 ft., a wildcat located a mile north of the Berland pool and the same distance east of the Eagle Creek pool, in southwestern Rooks County, where good saturation and porosity were found in the Arbuckle at 3,768-72 ft. (—1,549-53 ft.). The location is about a mile north of the Berland pool and about the same distance east of the Eagle Creek pool.

Discovery of another new pool in Barton County is indicated at Alpine Oil & Royalty Co. and Bradley Brothers 1 Rusco, SW SW SE 8-19-12, which made 3 bbl. of oil per hour in a 6-hr. swabbing test of Arbuckle lime at a total depth of 3,422 ft. The zone was topped at 3,417 ft. (—1,550 ft.). Casing was run to 3,418 ft. The new discovery is about 2½ miles southwest of the recently opened Cheyenne Valley pool and about 3 miles northwest of the North Hammer pool.

KANSAS SUCCESSFUL WILDCAT

Rice County: Lewis Drilling Co. et al 1 Schmidt, NE NE SW 4-19s-10w, pumped 135 bbl. of oil per day from Arbuckle at 3,312-35 ft.; anhydrite 480 ft., Hoxbar 2,810 ft., Lansing 2,964 ft. and 2,993 ft., conglomerate 3,299 ft., TD 3,335 ft.

KANSAS WILDCAT FAILURES

Barton County: Musgrove Petroleum Corp. et al 1 Rowley, SE SE NW 31-17s-14w, dry, TD 3,502 ft., anhydrite 942 ft., Hoxbar 3,121 ft., lime 3,185 ft., Lansing 3,193 ft., conglomerate 3,420 ft., Arbuckle 3,452 ft.

Kiowa Drilling Co. 1 Schneisweiss, NW NW SE 18-17s-11w, dry, TD 3,356 ft., anhydrite 723 ft., Hoxbar 2,959 ft., lime 3,058 ft., Lansing 3,074 ft., Arbuckle 3,340 ft.

E. H. Adair et al 1 Hammer, SW SE NE 28-19s-12w, dry, TD 3,428 ft., anhydrite 638 ft., Hoxbar 3,014 ft., Lansing 3,153 ft., conglomerate 3,398 ft., Arbuckle 3,415 ft.

Butler County: Rex-Morris & Elreco 1 Van Dever, NW NW SW 30-27s-6e, dry, TD 2,775 ft., Lansing 1,805 ft., Kansas City 2,120 ft., Mississippian 2,738 ft.

Ellis County: Amerada Petroleum Co. 1 Keller, SE SW NE 5-11s-19w, dry, TD 3,817 ft., anhydrite 1,430 ft., Topeka 3,048 ft., Hoxbar 3,268 ft., Lansing 3,316 ft., basal Kansas City 3,559 ft., conglomerate 3,602 ft., Arbuckle 3,675 ft.

Aurora Gasoline Co. 1 Dortland, SW SW NW 23-13s-16ew, dry, TD 3,470 ft., anhydrite 1,023 ft., Topeka 2,884 ft., Hoxbar 3,101 ft., Lansing 3,152 ft., conglomerate 3,402 ft., Arbuckle 3,436 ft.

Rooks County: Continental Oil Co. 1 Burton, SW SW SE 13-9s-18w, dry, TD 3,667 ft., anhydrite 1,438 ft., Topeka 3,045 ft., Hoxbar 3,247 ft., Lansing 3,289 ft., conglomerate 3,547 ft., Arbuckle 3,618 ft.

Derby Oil and Peel-Hardman 1 Holmes, NE NE NW 7-10s-20w, dry, TD 3,976 ft., anhydrite 1,755 ft., Hoxbar 3,521 ft., Lansing 3,558 ft., basal Kansas City 3,787 ft., cherty conglomerate 3,848 ft.

Russell County: Prime Drilling Co. 1 Lilak, NW NW NE 26-15s-11w, dry, TD 3,400 ft., anhydrite 686 ft., Hoxbar 2,884 ft., lime 2,974 ft., Lansing 2,994 ft., conglomerate 3,326 ft., Arbuckle 3,364 ft.

Sumner County: R. L. Williams 1 Hunt-Simpson, SE NE SW 2-31s-1w, dry, TD 4,032 ft., Stalnaker 2,690 ft., Lansing 2,990 ft., Mississippian 3,618 ft., Simpsan 4,012 ft.

The Texas Co. 1 White, SW NE SE 7-34s-2e, dry, TD 3,997 ft., Hoxbar 2,174 ft., lime 2,478 ft., Stalnaker 2,538 ft., Layton 2,938 ft., Bartlesville 3,542 ft., Mississippian 3,570 ft., Simpson sand 3,862 ft., Kinderhook 3,768 ft., Arbuckle 3,939 ft.

MISSISSIPPI

Wilcox Discovery May Go on Pump

JACKSON.—J. D. Reese is encountering completion difficulties at his new Wilcox oil-pool discovery, 1 George Armstrong, 19-5n-3w, Adams County. Casing was perforated at 6,592-95 ft. and the well flowed 57 bbl. of oil in 13 hours through 11/64-in. choke. Operators then killed the well and started swabbing. On first run of swab, 4,000 ft. of fresh water with slugs of mud was recovered. On second run of swab, the well started flowing. On 4-hour gage, the test flowed 55 bbl. under tubing pressure of 260 psi. The well started making considerable fresh water with slugs of mud and the tubing pressure dropped to 20 psi. The well then died, and if flow cannot be restored with swab, operator will install pumping equipment.

Pan-Am Production Co. encountered difficulty in running electric log after coring sand with show of oil in its wildcat, 1 S. J. Holloway, Jr., 23-6n-6e, Lincoln County. Cores with show of oil were found from 10,603-72 ft. Log was run to 10,670 ft. and then drill-stem test was run with packer set at 10,649 ft. testing to 10,672 ft. Of the total fluid recovered, 17 stands were water cushion, cut with oil, 4 stands oil, 2 stands oil-cut mud, plus 2 stands of brackish water. Bottom-hole flowing pressure was from 700 to 1,000 psi. An estimated 5 to 7 bbl. of 41.5 -gravity oil were recovered.

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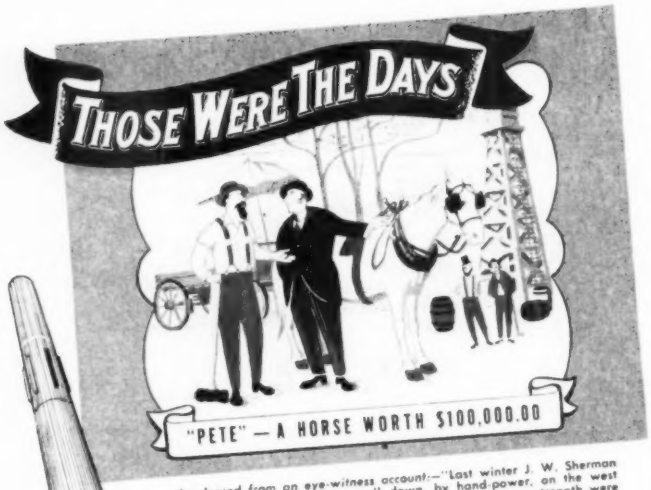

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very little information on its 1 Marion Davies et al, 15-3n-2e, Clarke County, Alabama, wildcat. It is reported that the well will be drilled to the Smackover lime. It has been reliably reported that oil shows were encountered in the Eutaw, Tuscaloosa and Lower Tuscaloosa sections. Even though the oil is low gravity, Humble is convinced it has an oil field.

Prospects for Travis Peak production in Mississippi look dim, in view of the status of three tests in the Pickens field area of Yazoo County. Carter Oil Co. 1 J. L. Wilson, Lower Cretaceous discovery for the area, is installing pump. Two and one-half miles west of the discovery, Ryan Oil Co. has abandoned 1 J. E. Maxwell, 14-12n-2e, after no shows of oil or gas were encountered. C. H. Wansley et al 1 Slaton & Henson, 24-12n-2e, is drilling ahead after taking several cores between 7,551 to 613 ft. with very slight shows of oil.

MISSISSIPPI WILDCAT FAILURES

Clarke County: Johnson-Reynolds-Cameron 1 Board of Supervisors, 16-2n-15e, dry, TD 5,612 ft.

Yazoo County: Ryan Oil Co. 1 J. E. Maxwell, 14-12n-2e, dry, TD 8,250 ft.

LA.-ARK.

El Dorado Deep Test Drilling Ahead

SHREVEPORT—In Union County, Arkansas, C. H. Murphy & Co. 1 Sue Olson, El Dorado field deep test in NE NE 32-18s-15w, recovered 1,000 ft. of water cushion, 2,930 ft. of gas and oil, 30 ft. of mud, and 150 ft. of salt water on a 12-minute drill-stem test in the Cotton Valley formation at 6,483-89 ft. Bottom-hole flowing pressure was 1,900 psi. It was drilling ahead below 6,490 ft., on an 8,000-ft. contract. A previous test from 6,119-29 ft. recovered 270 ft. of oil and water, reported to be 80 per cent oil, and 990 ft. of salt water.

Five miles east of Shuler field, British American Oil Producing Co. 1 Sheppard, NE NE 15-19s-17w, was coring in the Smackover at 8,596 ft. Top of the formation was 8,531 ft. A core from 8,544-95 ft. recovered dense lime with no shows.

C. H. Murphy 1 Pepper, 32-18s-15w, Smackover prospect, had total depth at 7,922 ft. and was fishing for testing tool. Perforations at 6,683-90 ft. had tested salt water with a light oil show, and were squeezed. Perforations at 6,670-78 ft. tested all salt water and were squeezed. The well showed for commercial production between 7,580-7,630 ft.

Bert Fields 1 Thigpen-Herold, Caddo Parish, Louisiana, wildcat in 23-16n-16w, recovered 3,000 ft. of water cushion and 10 ft. of mud, on a drill-stem test from 8,737-73 ft. It was coring ahead at 8,912 ft.

H. Barksdale Brown & Co. 1 Stout, SW SE 15-16n-9e, Franklin Parish, was reported to be shut down for orders at 5,000 ft., after running electrical surveys. Recovery of 30 ft. of oil-cut mud was reported on a drill-stem test from 4,470-75 ft.

Southwest Natural Production Co. 1 Colvin, 31-20n-2w, Lincoln Parish, cored gas and distillate odor from 8,719-64 ft., then drill-stem tested with packer at 8,738 ft. and recovered water cushion plus 200 ft. of gas and distillate-cut water and 210 ft. of gas and distillate-cut mud. There was no salt water. Bottom-hole flowing pressure was 3,500 psi. Operators cored ahead below 8,823 ft.

NORTH LOUISIANA WILDCAT FAILURES

Claiborne Parish: Barnsdall Oil Co. and Pan Am Production Co. 1 A. G. Worley, 5-22n-8w, dry, TD 6,052 ft., swabbed small amount of oil and gas 5,659-73 ft., section not identified.

Winn Parish: E. J. Bernheimer 1 Tremont Lumber Co., SW NE NE 24-12n-2w, dry, TD 1,184 ft.

OKLAHOMA

Washita County Wildcat Shows Strong Pressure

TESTING is being started at Carter Oil Co.'s prospective Anadarko basin discovery well, 1 Lee Galloway, NE NE NW 22-8n-18w, 2 miles west of Rocky, in southern Washita County. An alloy section which was run in the casing string opposite Granite Wash oil and gas showings at 5,229-5,327 ft. has been removed with caustic in the lower 40 ft. at 5,287-5,327 ft. While opening the window, heavy gas pressures with a flow estimated at 400,000 cu. ft. per day were encountered, blowing the caustic out of the hole and requiring the mixing of heavier mud to kill.

Showings of oil and gas were found all through the Granite Wash while drilling. Most promising interval drill-stem tested was at 5,305-55 ft. where 780 ft. of clean oil plus 30 ft. of oil and gas-cut mud were recovered. Another test at 5,410-39 ft. flowed gas and yielded 3 ft. of oil and 28 ft. of oil-cut mud. Hole was drilled to 7,616 ft. but no important showings were found below the Granite Wash, so casing was run only through the latter formation to 5,442 ft. In opening the alloy section, bottom in the casing was plugged back with chat to 5,337 ft. where 50 ft. of caustic was spotted.

Although full information still is withheld by the operator, two wildcats in the Ringwood field area of Major County are reported to be producing. Superior Oil Co. 63-9 Coppock, NE SW NE 9-21n-11w, 3 miles west and a mile south of nearest production in the Ringwood field, is reported to be flowing about 5 bbl. of 40 oil per hour through tubing. This company's 63-30 Fuller, NE SW NE 30-21n-10w, 4 miles south of production, is on the pump and is believed to be making about 75 bbl per day. Production in both cases is believed to be from the Manning sand, productive horizon of the Ringwood field. Total depth of the former well is 7,225 ft. That of the latter is 7,307 ft. The company's 23-23 Adkins, NE SW NW 23-21n-10w, 2½ miles south of production on the east side of the field, has been abandoned after drilling to a total depth of 7,322 ft.

In Garvin County, W. E. Steelman 1 Baldwin, SE NE NE 34-1n-1e, which opened a new pool 3½ miles west of Davis, has been put on the pump. It made 80 bbl. of 34° oil in the first 16 hours. Production is from Deese sand at 2,490-2,542 ft. The discovery is about 2½ miles southeast of the Northwest Hoover pool and about the same distance southeast of the Northeast Butterly pool.

A wildcat located 4 miles west of Drumright and 3 miles west of the Cushing field, in eastern Payne County, has found promising oil and gas showings in a shallow sand at 1,868-76 ft. It is Thomas N. Berry 1 Davenport, SE SW NE 34-18n-6e. On a drill-stem test of that interval, a recovery of 75 ft. of heavily oil and gas-cut mud was obtained. Original objective of the test was 3,500 ft. but casing has been cemented on top of shallow sand and an attempt will be made to complete the well in that pay.

OKLAHOMA SUCCESSFUL WILDCAT

Stephens County, Milroy area: Stanolind Oil & Gas 1 Truitt Unit "B," SE SW NW 12-2s-4w, pumped 9 bbl. of 21° gravity oil per day from unconformity-Springer sand at 4,254-4,344 ft., TD 5,256 ft.

OKLAHOMA WILDCAT FAILURES

Carter County, Brock area: Kirkpatrick 1 Morrison, SW NE SW 35-5s-1e, dry, TD 1,319 ft.

Cotton County: Hall 1 Mills, SW SW SW 10-5s-12w, dry, TD 1,774 ft. in shale.

Comanche County: Price et al 1 Byles, NW NE NE 20-2n-11w, dry, TD 368 ft.

Creek County, Olive area: N. T. Smith 1 Bath, NW NE SE 11-17n-8e, dry, TD

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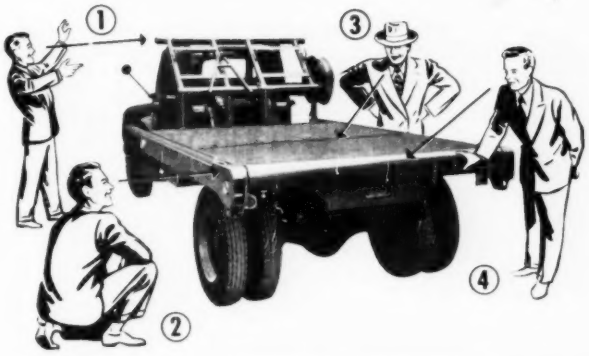

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3,216 ft., Hogshooter 1,128 ft., Oswego 2,126 ft., Prue 2,218 ft., Skinner 2,481 ft., lime 2,546 ft., Inola 2,762 ft., Bartlesville 2,776 ft., lime 2,880 ft., no Burgess, Mississippian 3,176 ft.

Kay County, N. Mervine area: Colpitt 1 Miller, NE NW SE 15-28n-3e, dry, TD 3,217 ft., Big lime 2,755 ft., Oswego 2,870 ft., Burbank 3,071 ft., Mississippi chat 3,185 ft.

Kingfisher County, NW Cashion area: Olson Drilling et al 1 Peckham, SW SW SE 26-16n-5w, dry, TD 7,795 ft., Avant 4,957 ft., Layton 5,513 ft., Oswego 6,354 ft., Mississippian 6,672 ft., first Wilcox 7,590 ft., second Wilcox 7,768 ft.

Lincoln County, W. Shamrock area: Wildkatz, Inc. 1 Ladd, SW SW NW 23-17n-6e, dry, TD 1,334 ft.

Logan County: Jordan 1 Signs, SW NW SW 18-16n-1w, TD 5,968 ft., Avant 3,863 ft., Perry gas sand 4,035 ft., Hogshooter 4,495 ft., Layton 4,525 ft., Oklahoma City Checkerboard 4,585 ft., Checkerboard 4,761 ft., conglomerate 4,792 ft., Oswego 5,215 ft., Verdigris 5,366 ft., Inola 5,420 ft., basal Pennsylvanian-Woodford 5,494 ft., Misener 5,525 ft., Hunton 5,546 ft., Sylvan 5,580 ft., Viola 5,677 ft., dolomite 5,730 ft., first Wilcox 5,854 ft., Marshall 5,883 ft., sandy dolomite 5,912 ft., second Wilcox 5,935 ft.

Marshall County: Helmerich 1 Taliaferro, NE SW SE 23-5s-5e, dry, TD 6,916 ft., Caney 4,540 ft., Sycamore 4,810 ft., Woodford 5,015 ft., Sylvan 5,155 ft., Viola 5,300 ft., Simpson 5,695 ft.

Okfuskee County: Wilcox 1 Wynne, NW SE 16-11n-10e, dry, TD 3,336 ft., Inola 2,312 ft., Bartlesville 2,335 ft., lime 3,576 ft., Booch 2,684 ft., lower Booch 2,771 ft., Gilcrease 2,951 ft., lower Gilcrease 3,095 ft., Union Valley 3,305 ft., Cromwell 3,321 ft.

Payne County: Mitchell-Gage Drilling 1 Rist, SE SW SW 27-19n-2e, dry, TD 4,521 ft., Checkerboard 3,530 ft., Big lime 3,750 ft., Oswego 3,780 ft., Skinner 4,103 ft., lime 4,130 ft., Red Fork 4,150 ft., Mississippian 4,313 ft., no Woodford, Misener 4,504 ft., Hunton 4,514 ft.

Foster Drilling 1 Griffith, SE SE SW 7-17n-6e, dry, TD 3,364 ft., Hogshooter 1,993 ft., Layton 2,024 ft., Checkerboard 2,312 ft., conglomerate 2,332 ft., Oswego 2,803 ft., Prue 2,857 ft., Verdigris 2,925 ft., Skinner 2,933 ft., Red Fork 3,208 ft., Inola 3,292 ft., Bartlesville 3,307 ft.

Pontotoc County: Bouse-Showalter 1 Peck, SE NE NE 17-4n-5e, dry, TD 1,343 ft.

Stephens County: Deardorf Oil 1 Barrett, SW SW SW 35-1n-9w, dry, TD 2,931 ft., Pontotoc 1,630 ft., Cisco 2,320 ft.

Washita County: Stanolind Oil & Gas et al 1 School Land 25, NE SW SW 36-9n-17w, dry, TD 13,505 ft.

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TEXAS GULF COAST

Jackson Discovery Being Dually Completed

HOUSTON—Southern Minerals Corp. is dually completing its new gas-condensate discovery 7 miles southeast of Vanderbilt, Jackson County. The discovery, I G. T. Brokking et ux, Josiah H. Bell Survey, Abstract 7, was completed in perforations at 6,848-52 ft. and 6,003-33 ft. Total depth of the well is 9,027 ft. and 5½-in. casing is cemented at 7,360 ft. No gages have been made as yet.

Three miles southeast of Lovell's Lake field, Jefferson County, Meredith, Clegg & Hunt have gaged the 1 Mrs. Euphemia Burrell for 55,000,000 cu. ft. of gas daily and 38.5 bbl. of distillate. The distillate tested 61.6° gravity, and the well had a shut-in pressure of 3,022 psi. Hole is bottomed at 8,400 ft. and production is through perforations at 8,278-91 ft. The new discovery is in the John F. French Survey, Block 7.

New oil production has been opened on the northwest flank of South Liberty dome, Liberty County, by L. M. Josey, Chad Nelms and Michael T. Halbouty. The new sander, I Chambers, M. G. White Survey, Abstract 7, flowed 200 bbl. of 39.6° gravity oil daily through a 9/64-in. choke, with 1,100-psi. pressure on the tubing. This well was originally drilled to a depth of 6,306 ft. and abandoned. Operators plugged back to 5,200 ft. in the hole and sidetracked away from the dome northwesterly to the total depth of 6,540 ft. It is reported that eight stands were logged in the hole. Production is through perforations at 6,270-6,340 ft.

Henderson Coquat has run a drill-stem test through perforations at 7,270-80 ft. in the I Wyatt Curry, Live Oak County wildcat, and recovered 70 ft. of condensate in 8½ minutes with 1,950-psi. working pressure. Operator has now installed christmas tree and is completing the discovery. The new discovery was drilled to 8,004 ft. and 5½-in. casing was set at 7,400 ft. It is located in the AB&M Survey, Abstract 53, 2½ miles northeast of Coquat field.

The 51 new locations include 9 wildcat starts, 1 each in Calhoun, Lavaca, Live Oak, Chambers, Hardin, Harris, Jefferson, Matagorda, and Orange counties. There were seven successful exploratory tests completed, one each in Bee, Goliad, Fort Bend, Jefferson and Orange counties, and two in Jackson County, while eight were dry, one each in Goliad, Victoria, Wilson, and Brazoria counties, and two each in Fort Bend and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Bee County: Gas discovery—Bridwell Oil Co. 1 F. V. Thomas, John Kelly Sur., A-22, 15 mi. NW of Woodsboro, TD 5,610 ft., perf. 4,137-40 ft., IP: 9,600,000 cu. ft. of gas, open flow.

Fort Bend County: New pay at South

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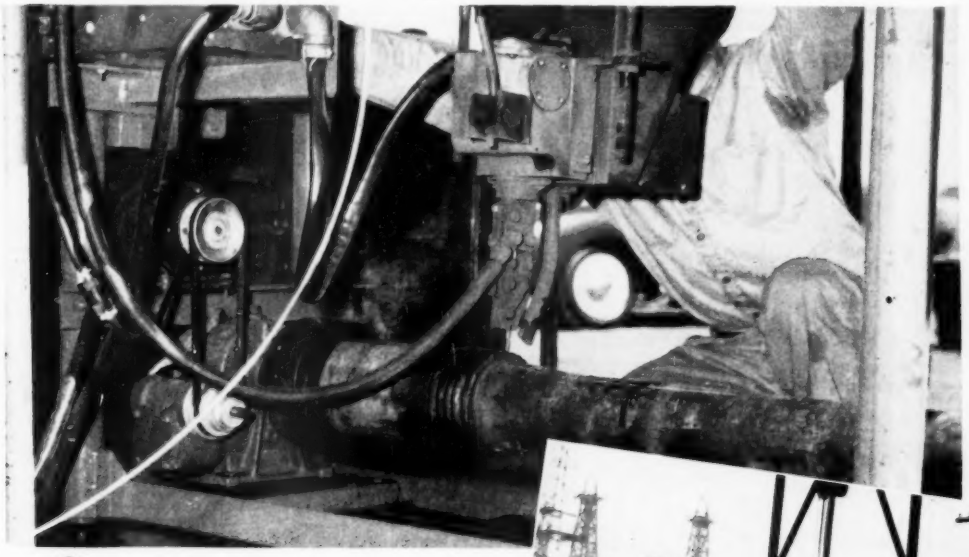

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Thompson—Cecil Hagen 2 J. H. P. Davis, Robert Peebles Sur., on S flank of field, TD 5,568 ft., top sand 4,325 ft. (Miocene), perf. 4,325-35 ft., IP: 125 bbl. oil per day, 10/64-in. choke, 25.5° grav.

Goliad County: New oil pool—Hugh Kirkpatrick 1 Mrs. Mary Lutenbacker, Sampson McTornall Sur., approximately 1 mi. S of Berclair gas field, 2 mi. NW of Berclair, TD 3,623 ft., perf. 3,194-200 ft., top sand 3,194 ft., IP: 99 bbl. oil per day, 10/64-in. choke, GOR 188, TP 220 psi., 27° grav.

Jackson County: Gas discovery—H. J. Porter 3 Rudolph Yaussi Est., et al, John McWhite Sur., A-268, 1 mi. SW of Cordele field, 7½ mi. NE of Edna, TD 2,796 ft., perf. 2,725-27 ft., IP: 72,000,000 cu. ft. of gas, open flow, SIP 1,020 psi.

Gas-condensate discovery—Sohio Petroleum Co. 1 L. M. Nyegaard et ux, W. D. Southerland Sur., A-76, 2 mi. N of Sterling gas field, 4 mi. N of Ganado oil field, TD 6,728 ft., perf. 6,416-21 ft., IP: 43 bbl. condensate plus 3,000,000 cu. ft. of gas daily, 3/16-in. choke, SIP 2,475 psi., 53.2° grav.

Jefferson County: Gas-condensate discovery—Meredith, Clegg & Hunt et al 1 Mrs. Euphemia Burrell, John F. French Sur., Block 7, 11 mi. E of Fannett, 3 mi. SE of Lovell's Lake field, top pay 8,282 ft., TD 8,400 ft., perf. 8,282-95 ft., IP: 38 bbl. condensate, plus 55,000,000 cu. ft. of gas daily.

Orange County: New oil discovery—John W. Mecom 1 East Beaumont Townsite Co. "Rose City," W. Stephenson Lge., A-23, 6 mi. E of Beaumont, TD 9,051 ft., top sand 8,102 ft. (Hackberry), perf. 8,122-28 ft., IP: 279 bbl. oil per day, 9/64-in. choke, TP 1,540 psi., CP 1,630 psi., 39.7° grav.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Dillard-Waltermire, Inc. 1 Freddie Cloudt, (Damond Mound area), HT&B Sur., A-575, 2 mi. SE of Damon Mound, dry, TD 10,286 ft.

Fort Bend County: Harold Link 1 Horelica, H&TC Sur. 66, 2 mi. S of Longs Point, dry, TD 5,553 ft.

Lloyd H. Smith, Inc. 1 J. V. Meek, Stephen Habermaker Sur., A-189, 6 mi. W-NW of Clodine, dry, TD 7,976 ft.

Goliad County: W. C. McBride, Inc., C-1 Mrs. W. D. Maetze, Gertrudis Barrerra Sur., A-2, 6 mi. NE of Goliad, dry, TD 5,270 ft.

Victoria County: Quintana Petroleum Corp. 1 W. C. Tracy, Desidio Garcia Sur., 2 mi. W-NW of Bloomington field, dry, TD 6,748 ft.

Wharton County: Sohio Petroleum Co. 1 Mrs. Jennie Beard, Sylvanus Castleman Lge., A-11, and D. D. D. Baker Sur., A-71, 1 mi. W of Lane City, dry, TD 7,085 ft.

Jergins Oil Co. & Newman Bros. Drilling Co. 1 Joe Borecky, WCRR Co. Sur., A-370, 3½ mi. S of Glenflora, dry, TD 4,860 ft.

Wilson County: George Parker and Charles L. McCune 1 J. V. Blake, Simon and Juan de Arocha Sur., 3½ mi. NE of Floresville, dry, TD 2,882 ft.

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APPALACHIAN FIELD

West Virginia Test Is Good Gas Well

PITTSBURGH.—In Portland district, Preston County, West Virginia, Hope Natural Gas Co. 9391 John & Edna Murphy, wildcat, was completed with a final test of 3,048,000 cu. ft. of gas, rock pressure 1,875 psi. The chert was logged at 5,218-5,360 ft., with gas at 5,248-57 ft.; the Oriskany sand was recorded at 5,411-94 ft., with gas at 5,416-17 ft., 5,423-25 ft., and 5,491-94 ft. Total depth was 5,511 ft. The final test of all gas resulted after shots. In Steele district, Wood County, Columbian Carbon Co. 1,1140 F. B. Allman et al, elevation 948 ft., after shooting, resulted in a dry hole. Tops were: Corniferous lime 5,119 ft., Oriskany 5,240 ft.; total depth 5,392 ft. In this Tri-County area (Wirt, Wood and Jackson) operations are under way by Clarence W. Meadows, Agent, at two locations: Steele district, Wood County, 2-L-449 C. A. Barnett, elevation 1,080 ft., Belleville Quadrangle, 2.3 mi. south of Lat. 39°, 05′ and 2.95 mi. west of Long. 81°, 30′; Tucker district, Wirt County, 1-L-471 F. W. Betts, elevation 900 ft., Belleville Quadrangle, 2.1 mi. south of Lat. 39°, 05′ and 2.55 mi. west of Long. 81°, 30′. Also in Tucker district, United Fuel Gas Co. 6549 S. O. Toncray, elevation 836 ft., ran 7-in. casing at 5,050 ft., with the Corniferous lime at 5,021 ft.; the company's 6550 T. S. Counts, elevation 945 ft., had the Oriskany sand at 5,288 ft., encountered salt water at 5,290 ft., and is drilling at 5,294 ft.

In Derry Township, Westmoreland County, Pennsylvania, Peoples Natural Gas Co. 4-3814 Camilla Giffen, elevation 2,238 ft., is drilling at 9,161 ft. In Napier Township, Bedford County, South Penn et al, Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 7,229 ft.

WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County, Portland district: Hope Natural Gas Co. 9391 John & Edna Murphy, elev. 2,152 ft., IP 3,048,000 cu. ft. of gas, after shot, from chert at 5,248-57 ft., and Oriskany sand at 5,416-17 ft., 5,423-25 ft., and 5,491-94 ft., TD 5,511 ft.

WEST VIRGINIA WILDCAT FAILURE

Wood County, Steele district: Columbian Carbon Co. 1-1140 F. B. Allman et al, elev. 948 ft., dry, Corniferous lime 5,119 ft., Oriskany sand 5,240 ft., TD 5,392 ft.

N. CENTRAL TEXAS

Montague County Test Running Casing

WICHITA FALLS—Three miles south of Nocona, in Montague County, B. F. Phillips, Jr., 1 W. M. Brooks, conglomerate wildcat in the MEP&P Survey, A-517, had total depth in the conglomerate at 5,881 ft. and was running casing. First core in the Strawn from 4,753-58 ft. recovered 4 ft. of sand with oil show, and a drill-stem test from 4,748-58 ft., open 1 hour, recovered 30 ft. of slightly oil-cut mud. A second test from 5,068-74 ft., open 1 hour, recovered 20 ft. of mud and 180 ft. of salt water.

Conglomerate with light oil show was drilled from 5,867-81 ft. A test on the section had gas in 18 minutes and recovery in 1 hour was 315 ft. of oil, and 150 ft. of heavily oil-cut mud. Flowing pressure was 160 psi. Operators ran electrical surveys.

Superior Oil Co. 1 H. C. McKinney, TE&L Survey, Throckmorton County, continued testing after pumping 88 bbl. of oil a day from Caddo perforations at 4,488-4,506 ft. The well was scheduled to 5,400 ft. to test the Mississippian, in the new Caddo area.

Akim & Dimock 1 J. I. Gentry, Wise County Ellenburger test 1 mile north of Cottondale, Matagorda CSL Survey, had total depth at 7,176 ft. in dolomite. Top of the Ellenburger was reported at 7,001 ft., on elevation of 806 ft. A 2-hour test from 7,018-96 ft., on which the tool was partially plugged for 1 hour, recovered 360 ft. of mud with a show of gas. A second test from 7,088-94 ft., open 50 minutes, recovered 45 ft. of mud.

In the same area, Akin & Dimock 1 Annie Wages, completed for 5 bbl. of oil a day from the Strawn at 3,724-64 ft. The well was originally scheduled to 6,100 ft. as a conglomerate test but the hole was caving badly at total depth of 3,937 ft.

In Eastland County, 5 miles southwest of Cisco, Lone Star Producing Co. 1 J. W. Dennison, 107-3-H&TC, completed for a 14-bbl. Caddo discovery at 3,008-48 ft. Total depth was 4,054 ft. in the Ellenburger.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Comanche County: Texas Crude Oil Co. 1 Burton, 82-1-Lampasses CSL, 11 mi. SE Rising Star, TD 3,008 ft., PB 2,600 ft., elev. 1,500 ft., Pennsylvanian pay 1,590 ft., IP pumped 134.75 bbl. 40 -grav. oil a day, GOR 740 cu. ft.

Jack County: Roeser & Pendleton, Inc., and F. Kirk Johnson 1 Jackson Heirs, Lot 39, Lge. 2, Henderson CSL, 13 mi. SE Jacksboro, extension well, TD 4,490 ft., conglomerate pay 4,480 ft., IP flowed 109.8 bbl. 40 -grav. oil a day, 26/64-in. choke, GOR 402 cu. ft., CP 500 psi., TP 105 psi., top Caddo 4,444 ft.

Jones County: D. M. Myatt and W. B. Kock, Jr. 2 D. M. Myatt, 1-15-T&P, 7 mi. S Lueders, TD 1,806 ft., elev. 1,598 ft., top pay 1,802 ft., IP pumped 22 bbl. 38 -grav. oil a day.

Shackelford County: J. E. Roberts, Jr. et al 1 Tull Newcomb, 5-A-AB&M Sur., NW corner of county, TD 1,904 ft., elev. 1,597 ft., pay 1,886 ft., IP pumped 16 bbl. 38 -grav. oil a day, GOR 80 cu. ft.

Throckmorton County, discovery or new pay: James H. Snowden 1 R. A. Mills, Sec. 3,096, TE&L Sur., 2½ mi. NE Throckmorton, TD 4,366 ft., elev. 1,302 ft., top Caddo pay 4,358 ft., perforated 48 shots 4,358-65 ft., IP flowed 121 bbl. 39 -grav. oil in 4 hr., ⅜-in. choke, GOR 610 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Bolin Oil Co. 1 V. Seay, Blk. 63, Harris Subd., 9 mi. W Archer City, dry, TD 3,161 ft., elev. 1,047 ft.

W. G. Steed 1 L. Sullivan, Lot 32, Blk. 3, Clark & Plumb, 2 mi. SW Scotland, dry, TD 1,319 ft., sand with odor 1,306-19 ft.

Frank Wood 1 Cecil Mankins, Sec. 1, SPRR Sur., A-427, ¾ mi. NE Mankins, dry, TD 1,832 ft., elev. 1,070 ft.

Baylor County: C. G. Hart 1 W. W. Smith and A. D. Hammett, Sec. 3,132 ft., TE&L Sur., A-538, 2 mi. E Roundtimber, dry, dry, TD 1,600 ft., no shows.

Brown County: E. J. Anderson 1 D. M. Markham, Blk. 8, H. R. Brewster Sur., 790, 3½ mi. SW Rising Star, dry, TD 1,315 ft., elevation 1,628 ft.

Worth Thomason 1 R. A. Thomason, D. R. Whitley Sur., A-1191, 5 mi. NW Brownwood, dry, TD 2,220 ft., elevation 1,535 ft., Caddo 1,400 ft., Ranger 1,866 ft., Mississippian 2,196 ft.

Callahan County: J. K. Wadley and Delaware Drillers 1 C. W. Musick, Sec. 53, LAL Sur., 10 mi. SW Clyde, dry, TD 4,807 ft., elevation 2,044 ft., sand 1,941 ft., Caddo 4,300 ft., Ellenburger 4,725 ft., DST in Ellenburger had gas.

Clay County: W. B. Omohundro 1 Mary Brown Magruder, Blk. 11, Hopkins CSL, ¾ mi. S Bluegrove, dry, TD 4,821 ft.

E. E. Reynolds 2 T. S. Adams, Blk. 148, Byers Subd., 4½ mi. NW Byers, dry, TD 2,018 ft.

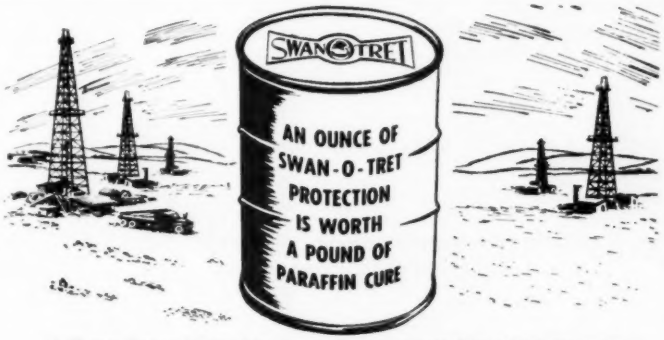
John T. Wilson 1 J. Weist, Blk. 55, Parker CSL, 4 mi. SE Petrolia, dry, TD 2,014 ft.

Cooke County: W. T. Lucas 1 W. R. Thornton, L. C. Gibbs Sur., A-402, 2½ mi. SE Bulcher, dry, TD 1,334 ft.

Coleman County: Connally Thornton 1 C. A. Crump, HT&B Sur. 55, 2 mi. E Santa Anna, dry, TD 2,449 ft., elevation 1,019 ft., Marble Falls 2,402 ft.

Comanche County: Ray & Wolfe 1 J. R. Wallace, 1-1-H&TC, 5 mi. SW DeLion dry, TD 3,110 ft., Ellenburger 3,012 ft.

Jack County: Karl Mulligan 1 Mettie Tibbs No. 4, Blk. 6, Wm. M. Donald Sur., A-378, 11 mi. SE Antelope, dry, TD 384 ft.



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Shackelford County: Exploration Drilling Co., Inc. 1 W. H. Green, Sec. 22, BAL Sur., 5 mi. N Sedwick, dry, TD 767 ft., no shows.

Stephens County: E. Orcutt 1 G. D. Diskie, Geo. Waggoner Sur., A-921, 3½ mi. S Woodson, dry, TD 610 ft.

PERMIAN BASIN

Kent Wildcat May Have Topped Canyon Reef

MIDLAND — Caroline Hunt Trustee Estate 1 J. W. Young, 166-G-W&NW Survey, Kent County wildcat holding attention, was setting 7-in. casing at last report. The wildcat is still credited with topping the Canyon reef and at 6,204 ft., minus 4,116 ft., and also with having about 175 ft. of effective pay section. Casing point was not disclosed. The well was originally scheduled to 8,500 ft.

South of the Hunt test, toward Cogdell field, Estill Heyser, Jr., 1 L. T. Lohman, 42-G-W&NW Survey, 8 miles southwest of Clairemont, had total depth at 6,323 ft. in Pennsylvanian sand and shale, with no reef reported. Drilling was to resume after rig repairs.

Ted Weiner and associates 1 Alice A. Corriker, 87-G-W&NW Survey, recovered 240 ft. of heavily oil and gas-cut mud, on a 45-minute drill-stem test of a lime section at 7,040-55 ft. A second test was being prepared, to total depth of 7,247 ft.

Lewis T. Lohman 1 J. W. Young, 98-G-W&NW, 11 miles west of Clairemont, continued testing, with prospects of making completion potential this week. It had total depth at 7,895 ft., plugged back to 7,633 ft. Strawn perforations were at 7,353-59 ft.

Drilling reports on other Kent County tests were: General Crude Oil Co. 1-A Jones, 79-G-W&NW, drilling below 6,676 ft.; Mid-Continent Petroleum Corp. 1 Wallace, Tract 3, 776-97-H&TC, 5 miles north of the Cogdell field, drilling in shale at 5,965 ft.; Barnsdall 1 Spires, 22-4-H&GN, drilling in shale at 5,560 ft., and 10 miles east of the Cogdell field, Coronado Oil Co. 1 Fleming, 53-K-T. A. Thompson Survey, was drilling at 4,453 ft.

In Cogdell field, Chapman & McFarlin 5 Cogdell, 715-97-H&TC, completed for 565 bbl. of oil a day, based on a 6-hour test through ¾-in. choke. Completion was without acid, from pay topped at 6,650 ft., to 6,710 ft., total depth.

Borden County's prospective discovery, Barnsdall Oil Co. 1 W. L. Wilson, NE NE 16-27-H&TC, 2 miles west of Standard of Texas 1-6 Griffin, Ellenburger failure, was running 7-in. casing to 7,425 ft., total depth. The well topped a lime, identified variously as Canyon reef and as Strawn, at 7,410 ft., on an elevation of 2,481 ft. A 53-minute drill-stem test from 7,410-35 ft. had gas in 3 minutes and flowing oil in 13 minutes. It flowed into pits at an estimated rate of 30 to 40 bbl. an hour. Recovery in the pipe was 1,891 ft. of 43 -gravity oil. Flowing bottom-hole pressure was 2,600 psi., and shut-in pressure was 3,250 psi. in 15 minutes.

If the pay section is the reef, its minus datum point of 4,929 ft. would check 259 ft. high to Standard 1-6 Griffin, and 521 ft. low to Livermore 1 Reinecke, discovery in 53-25-H&TC; and 462 ft. low to Amerada 1 Von Roeder, another discovery in 103-25-H&TC.

In Scurry County, Warren Oil Co. 1 J. M. Reynolds, 101-25-H&TC, 2 miles west of Sharon Ridge Canyon field, had corrected total depth at 6,708 ft., with 7-in. casing set at 6,688 ft. Perforations in the casing were made at 6,628-45 and 6,649-85 ft. It was also given 20 shots in the uncased section from 6,700-05 ft. Tubing was run to 6,626 ft., mud displaced with water, and the well kicked off to flow into pits. At last report it was flowing to clean out.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Runnels County: E. K. and E. M. Burt 1 Mrs. Malinda Jameson, ETRR Sur. 118, 1½ mi. NW Talpa, dry, TD 3,614 ft., elev. 1,913 ft., Home Creek 2,450 ft., Palo Pinto 3,075 ft., upper Capp 3,245 ft., upper Fry 3,315 ft., lower Fry 3,360 ft., Gardner sand 3,476 ft., lower sand 3,546 ft., Gray sand 3,592 ft., Gardner sand showed oil and gas-cut mud on drill-stem tests.

Schleicher County: E. M. Wahlenmaier, Morgan, Aikman & Co. 1 Pat H. Jackson & Wren J. Jackson, NE NE 46-H-GH&SA, NE part of county, dry, TD 6,005 ft., elev. 2,372 ft., Strawn 5,038 ft., Detrital 5,592 ft., Ellenburger 5,602 ft., Strawn and Ellenburger carried sulfur water.

Sutton County: Nelson Bunker Hunt and William Hamm, Jr. 1 G. F. Stewart, SW NE 5-GC&SF Sur., SE part of county, dry, TD 6,168 ft., elev. 2,343 ft., first lime 4,254 ft., Bend 5,578 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Amerada Petroleum Corp. 2-BTD State, northeast extension to Bagley Devonian field, in 35-11s-33e, swabbed 167 bbl. of fluid in 11 hours, then treated with 500 gal. of acid and flowed 12½ bbl. of oil an hour for 24 hours through ¼-in. choke. Top of the Devonian was 10,699 ft., drilled to 10,975 ft.

Shell Oil Co. 1 W. V. Lawrence, 32-17s-39e, had total depth at 13,930 ft. in shale and lime, and was preparing to drill-stem test. Top on the Simpson was 13,580 ft.

Stanolind Oil & Gas Co. 2 S. Mattix Unit, SE SW 15-24s-37e, one location southwest to Fowler field, was drilling below 10,095 ft. in lime. A drill-stem test from 9,953-68 ft., in the top of the Ellenburger, had gas in 20 minutes and recovered 1,100 ft. of 41-gravity oil, under 200 psi. flowing pressure. A 5-hour test from 9,945-10,008 ft. recovered 1,450 ft. of oil and a 2-hour test from 10,000-58 ft. had gas in 59 minutes but recovered 220 ft. of heavily oil and gas-cut mud.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Lea County, discovery or new pay in Skaggs area: Continental Oil Co. 2-B-28 Warren, NW SE 28-20s-38e, 1 mi. E Continental 1-B-29 Warren, McKee discovery; TD 9,072 ft., PB 6,806 ft., elev. 3,549 ft., top Drinkard 6,593 ft., top pay 6,764 ft., IP flowed 197 bbl. 33-grav. oil a day, choke (?), GOR 7,123 ft., TP 700 psi.

EASTERN TEXAS

Shallow Drilling Attracts Interest in Denton County

DALLAS—Shallow drilling, to what has been called a Pennsylvanian sand, north and northwest of Bolivar in northwest Denton County, has attracted considerable interest. The original Bolivar field, northwest of the townsite, was a gas field, with some oil production. Recent drilling has established production around 2 miles north and northwest of the townsite. The oil ranges from 34-40 gravity and completions potentials have been reported from 5 to 500 bbl. daily.

This week a 1-mile extension was expected at W. H. Rouzer et al 2-A Bowery, January Survey, and 1 mile northeast of the town. Oil sand was found from 1,553-63 ft. and operators were setting pipe.

D. H. Bolin 1 M. L. Moore, H. Tierwester Survey, 4 miles east of south Bolivar field, was drilling shale at 1,720 ft. In the area between the north and south fields, Sussex Oil Co. staked location for 3 Armstrong, 900 ft. from north and 1,200 ft. from west lines, R. Howard Survey.

An Ellenburger wildcat 10 miles east of the area was staked by Tom P. Lovell and

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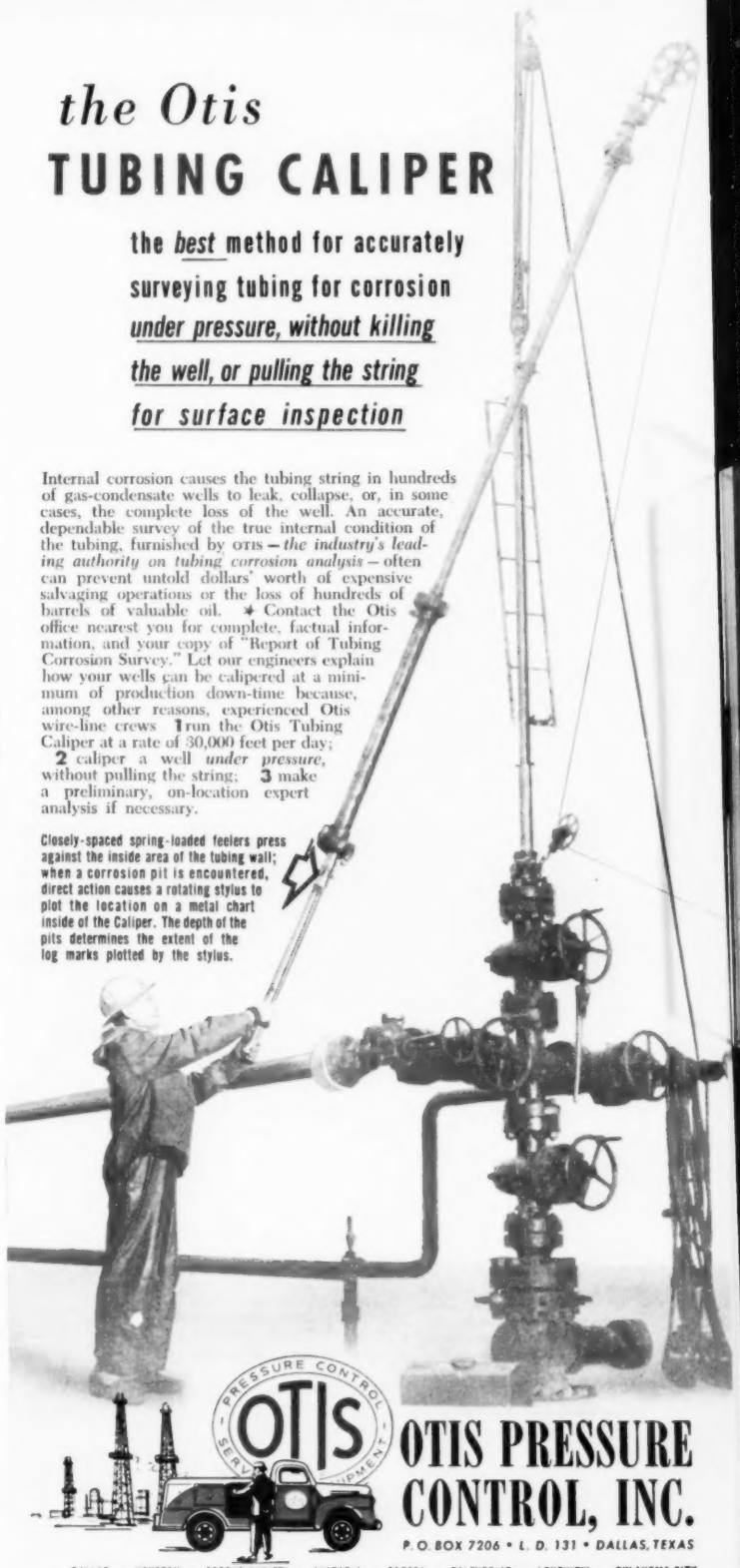
Closely-spaced spring-loaded feelers press against the inside area of the tubing wall; when a corrosion pit is encountered, direct action causes a rotating stylus to plot the location on a metal chart inside of the Caliper. The depth of the pits determines the extent of the log marks plotted by the stylus.



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associates as 1 John Schertz, 150 ft. from east and 535 ft. from south lines of the Manchaca Survey, 6 miles east of Sanger.

Humble Oil & Refining Co. 1 Mrs. Ruth Frank, Jefferson Wilson Survey, Nacogdoches County wildcat 3½ miles southeast of Douglas, plugged back to 9,250 ft. from total depth of 9,621 ft. and was running casing. Cores from 9,486-9,621 ft. recovered shale and red beds, with no shows.

In Shelby County, 6 miles east of Patroon, R. L. Milam 1 W. A. Bridges, R. S. Forbes Survey, A-21, a dry hole in 1948 at 6,015 ft., cleaned out and completed as a flowing well from Georgetown perforations at 3,650-54 and 3,656-60 ft. Initial potential was 89 bbl. of clean 38°-gravity oil a day through 12/64-in. choke. Pressures were 300-900 psi. on tubing and 1,470 psi. on casing. Operators had reported gas bubbles around the plugged surface casing. The hole was cleaned out to 4,965 ft. and drill-stem tests and side-wall cores were taken up the hole.

Three and one-half miles south of Tyler, Bobby Manzield 1 John Campbell, Robert Fletcher Survey, A-359, wildcat test which blew gas and distillate over the derrick for a week out of control, ran 2-in. tubing under pressure to 7,812 ft. and killed the well with water. At last report operators were rigging up a christmas tree and had erected two 500-bbl. tanks for testing. Total depth was 8,001 ft. in shale, and perforations were corrected to 7,668-78 ft.

The well blew out after setting casing to 7,994 ft., then perforating in the Paluxy. Operators were bringing the perforating gun out of the hole when it blew out. The gun was blown out later, knocking the crown block off the derrick.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURES

Denton County: Taubert Drilling Co. 1 J. P. McGee, J. M. Ruiz Sur., A-1065, 6 mi. NW Krum, dry, TD 1,812 ft.

Hill County: J. F. McLaughlin 1 East-E. Doherty, N. T. Roberts and E. L. Hale Sur., 2½ mi. NE Mt. Calm, dry, TD 1,388 ft., Woodbine 1,172 ft. by samples, said to have had 200 ft. of broken Woodbine section with some shows.

Houston County: Geier-Jackson, Inc. 1 B. R. Guice, W. M. Caskey Sur., 3 mi. N Grapeland, 1 mi. NW Grimes field production, dry, TD 5,985 ft., Woodbine 5,982 ft.

Titus County: W. B. Hinton 1 Jim Stephenson, J. A. Brooks Sur., 8½ mi. N Mt. Pleasant, dry, TD 4,888 ft., Paluxy around 4,737 ft.

SOUTH LOUISIANA

Calcasieu Test Potentialed For 291 Bbls.

NEW ORLEANS—Ohio Oil Co. 1 E. W. Brown, Jr., Calcasieu Parish oil discovery, was potentialed for 291 bbl. of 43°-gravity oil daily through a 10/64-in. choke. The well is producing through perforations at 7,781-82 ft. in the Brown "A" zone. This new discovery is located in the southeast corner of 20-11s-13w, just across the line from Orange, Tex. Oil men claim its completion will force settlement of the ancient boundary dispute between Texas and Louisiana.

Operator has announced intentions to drill a new offset to the discovery. The offset will be 1,320 ft. west of the discovery well, which brings it nearer the Sabine River.

In the Sweet Bay Lake area of St. Mary Parish, 10-12s-12e, Sun Oil Co. 1 State Lease 1,337 flowed 240 bbl. of 34.3°-gravity oil daily through a ⅛-in. choke. The wildcat in 10-17s-12e, was drilled to a depth of 11,775 ft. and has 7-in. casing cemented at 10,520 ft. Production is through perforations at 10,051-56 ft. This marks St. Mary Parish's first discovery this year.

Off Plaquemines Parish, Shell Oil Co. is testing the 1 State Lease, 1,008, wildcat test in the South Pass area. On initial test, the well flowed 375 bbl. of 30.7°-gravity oil daily through a 9/64-in. choke, with 2,800 psi. tubing pressure. The well is producing through perforations at 11,293-99 ft. Several other sands are present in the well, and operators will probably test them before final completion.

Texas Co. has finaled the 1 Lillie Boudreaux for 206 bbl. of 38.8°-gravity oil daily through an 8/64-in. choke. The well is bottomed at 10,002 ft. and production is through perforations at 7,981-86 ft. This new discovery is located in 30-5s-8e, 1½ miles northwest of Fordoche field and 2 miles west of Lottie townsite, Pointe Coupee Parish.

The 17 new locations include 2 wildcat starts, 1 each in St. Martin and Terrebonne parishes. There were three successful exploratory tests completed [illegible] in Iberia, Plaquemines, and Pointe Coupee parishes, while three were staked, each in Beauregard, Cameron, and Jefferson parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Iberia Parish: Extension to Weeks Island field—Gulf Refining Co. 1 Provost-Cyr Unit, 19-14s-7e, 1¼ mi. SE Shell's deep production on NE flank of Weeks Island Dome, TD 13,786 ft., top pay 13,396 ft., perf. 13,396-418 ft., IP: 335 bbl. oil per day, 10/64-in. choke, TP 1,800 psi., 34.1° grav.

Plaquemines Parish: New pay at Black Bay—Gulf Refining Co. 5 Louisiana State Lease 195 QQ, 17s-17e, TD 11,503 ft., top pay 10,420 ft., perf. 10,420-30 ft., IP: 186 bbl. oil per day day, ⅛-in. choke, 39° grav.

Pointe Coupee Parish: New oil discovery—Texas Co. 1 Lillie Boudreaux et al, 30-5s-8e, 1½ mi. NW of Fordoche field, 2

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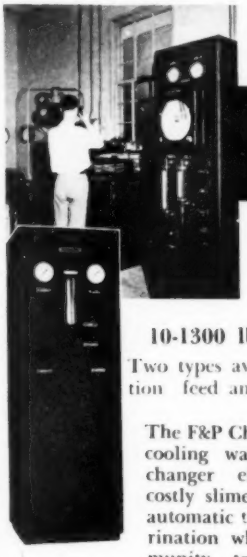

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WRITE FOR CATALOG 61

FISCHER & PORTER CO. Dept. ON2-3E Hatboro, Pa.

mi. W of Lottie townsite, TD 10,003 ft., top pay 7,981 ft., perf. 7,981-86 ft., IP: 206 bbl. oil per day, 8 64-in. choke, GOR 335, TP 1,125 psi., 38.8 grav.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: Magnolia Petroleum Co. C-1 Long Bell, 12-5s-7w, 2 mi. S of Dry Creek townsite, dry, TD 9,850 ft.

Cameron Parish: Sohio Petroleum Co. 1 F. Nunez, 30-14s-7w, 5 mi. NE of Creole, dry, TD 12,030 ft.

Jefferson Parish: California Co. 1 Felming et al St. 1706, Bayou Desoies area, 44-16s-24e, dry, TD 10,600 ft.

ROCKY MOUNTAIN

Gas Found in Muddy In Logan County

DENVER—Gas was found in the Muddy sand at British-American Oil Producing Co. S Segelke, NE NW NE 26-11n-53w, wildcat in the Armstrong area, Logan County, Colorado. On drill-stem test between 5,260-70 ft. the well flowed at the rate of 3,500,000 cu. ft. of gas daily through ½-in. choke in 17 minutes. Top of the Muddy sand was logged at 5,232 ft. and cores showed fine grained sand interbedded with shale with slight staining and distillate odor. The sand had very low porosity. In the lower section of the Muddy the sand was more porous and the gas odor was much stronger. British-American plans to core further in the sand and continue tests of the Muddy.

The well was originally scheduled as a test to the Dakota in this area. It is located on a block farmed out from Plains Exploration Co., of Denver, and others and British-American and Plains have acquired additional lands throughout the area. British-American did extensive seismic work prior to making location for the wildcat. Plains has drilled two wells, one east of the present test and the other west with both dry holes through the Dakota sand. This present well is the first to find gas in the long series of wildcat ventures throughout northeastern Colorado during the past year.

The well is located 20 miles southwest of Ohio Oil Co.'s Huntsman gas field, Cheyenne County, Nebraska. The Huntsman discovery early this year has been followed by extensive leasing throughout the entire Denver-Julesburg basin of northeastern Colorado, western Nebraska, and southeastern Wyoming. Numerous wildcats are scheduled in this area during the coming year.

After spending several weeks fishing at its deep wildcat at 1 Unit, SE NE NW 35-39n-89w, in the Badwater area, Natrona County, Wyoming, Pure Oil Co. is now whipstocking by fish. The wildcat was drilled to 14,154 ft., total depth, and the operator nearly lost the hole through the difficult fishing period. The well was initially planned as a Frontier sand test, but it is believed that the well is still in Mesa Verde at the present depth. A whipstock was set at 13,648 ft., and a second at 13,666 ft. and the operator is now drilling below the third whipstock. This wildcat was located following extensive seismic work by Pure in the northeastern Wind River basin area. It is northwest of Pure's West Poison Spider field, where Mesa Verde and Frontier sand production has been established, and east of the Lysite area where Sinclair Oil & Gas Co. drilled a deep wildcat failure 4 years ago.

New activity is planned for the Lindrith area, Rio Arriba County, New Mexico, during the coming year. Denman Drilling Co., of Wichita Falls, has staked location for 1 Palmer, C NW SE 1-24n-2w, 5 miles northeast of the Delhi Oil Corp. Dakota sand discovery well. Delhi and Magnolia Oil Co. plan another test on their block as soon as unitization is completed. At 1 Ingwersen, C SE SE 20-24n-2w, Delhi is now installing pumping equipment to continue tests after pulling the 2-in. tubing and replacing with 2½-in. The well is producing from the second bench of Dakota sand, and has been averaging approximately 100 bbl. of oil daily with some water. The discovery was considered of importance for the future of wildcat drilling throughout the southeastern area of the San Juan Basin. The well was drilled following seismic work through the area.

New locations.—There were 14 new locations with 11 in Wyoming, and 1 each in Colorado, Montana, and western Nebraska. In Wyoming, Atlantic Refining Co. announced location for a wildcat in the North Alkali Butte area, east of the company's Riverton field, Fremont County. The new well is planned as a test below 7,500 ft., possibly to Tensleep, and is located in CS½ SE SE 29-1s-6e (WRM). Hooker-De-Mohrenschildt, of Denver, is preparing to drill a wildcat in the Chimney Rock area at 1 Government, NW NW SE 35-18n-70w, Laramie County, Wyoming, with the well planned as a 4,300-ft. Sundance test.

Completions.—There were 12 completions during the week with 4 in Wyoming, 1 in Montana, 2 in western Nebraska, 1 in South Dakota, and 4 in northern New Mexico. In western Nebraska, Cope & Associates plugged the Southeast Chappel wildcat with the well in red beds at total depth. Shows were logged in the Muddy sand, but the section was hard and tight. Earl E. Evans et al plugged the Indianola wildcat, Red Willow County, Nebraska, after failing to obtain production in Kansas City. William Seyler Oil Co. has plugged a wildcat in Meade County, South Dakota, with the well drilled into Cambrian at 5,759 ft., total depth.

NEBRASKA WILDCAT FAILURES

Southeast Chappel, Deuell County: Cope & Associates 1 Saiser, NW NE SE 2-12n-45w; 4,214 ft. TD; abnd.; Chadron 425, Pierre 470, Niobrara 2,550 ft., Carlyle

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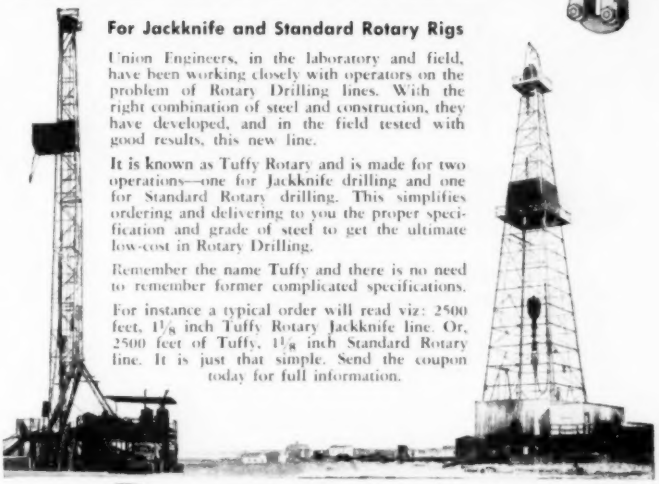

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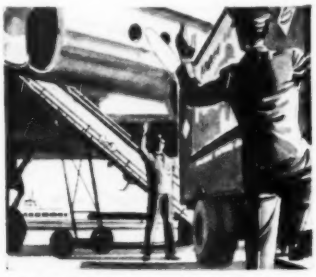

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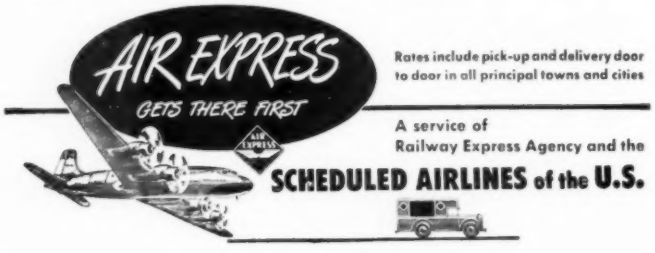

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Indianola area, Red Willow County: Earl E. Evans et al 1 I. Poore, C SE SW 6-3n-27w; 3,550 ft. TD; abnd.; Fort Hays 615, Dakota 930, anhydrite 1,992, Heiber 3,132, Toronto 3,150, Lansing 3,166, Kansas City 3,191, granite 3,544 ft.

SOUTH DAKOTA WILDCAT FAILURE

Piedmont area, Meade County: William Seyler Oil Co. 1 Government, SW NW SE 12-8n-5e; 5,759 ft. TD; abnd.; Niobrara 430, Carlyle 735, Greenhorn 1,110, Graneros 1,210, Dakota 2,210, Fuson 2,250, Lakota 2,300, Morrison 2,420, Sundance 2,670, red beds 3,050, Minnekahta 3,500, Opeche 3,540, Minnelusa 3,632, Red Marker 3,930-46, Leo 4,005, Madison 4,253, Inglewood 5,250, Whitewood 5,280, Cambrian 5,515 ft.

MICHIGAN

Sun May Have New Traverse Field

MOUNT PLEASANT—Sun Oil Co. may have opened a new Traverse oil field in Garfield Township, Newaygo County, at its 1 Wood, NW SW SE 19-12n-13w, a wildcat located about 3 miles southwest of Kimball Lake field which was opened by Sun and developed in 1947.

On drill-stem test, the 1 Wood flowed oil and gas from the Traverse in 45 minutes at 2,227 ft., total depth. Top of Traverse was checked in at 2,224 ft. No water was showing on this test. Five-inch casing was being run and cemented at 2,215 ft. and cleanout and completion were scheduled for early next week. Pay was tapped late Wednesday, March 22.

This wildcat followed an extensive core-drill program in the area by Sun and at least two other Traverse-zone wildcat tests had been drilled by the company on this block within a radius of 2 miles. A preliminary check of the acreage under lease in the district appeared to indicate that Sun owned everything within a mile of the potential new discovery.

An encouraging, but small, oil show was under test at Dale M. Leonard 1 Haddaway, N½ NE NE 8-1n-16w, Casco Township wildcat, Allegan County. Traverse limestone was logged at 1,156 ft. Oil show came in at 1,158-59 ft. and hole was bottomed out for test at 1,176 ft.

On a 12-hour fillup test, hole carried two bailers of free oil and a half bailer of salt water. It was believed that water came in when well was deepened from 1,159 to 1,176 ft. Tests were being continued.

Norman L. Stevens owns the bulk of the acreage around this new wildcat and further exploratory drilling appeared to be assured for this district regardless of the outcome of Leonard's wildcat test.

MICHIGAN WILDCAT FAILURES

Isabella County, Isabella Township: Alan Gray 1 Miller et al, NW NE NW 19-15n-4w, Dundee 3,800 ft., dry, TD 3,817 ft.

Montcalm County, Belvidere Township: Mercer Oil Co., Inc. 1 Sagendorf, SE SE SE 26-12n-7w, Dundee 3,451 ft., dry, TD 3,464 ft.

Home Township: Stewart Oil Co. & Burks White 1 Myers-Burns-Stewart-White Comm., SW SE SE 13-12n-6w, Dundee 3,431 ft., dry, TD 3,550 ft.

Oceola County, Cedar Township: Union Development Co. 1 McLain-Horn, NW NW NE 17-18n-9w, Dundee 3,816 ft., dry, TD 3,961 ft.

Van Buren County, Bloomingdale Township: Wm. C. Vandenberg, Jr. 1 Kop-

terski 1, NE NE SW 20-1s-14w, Traverse 1,283 ft., dry, TD 1,333 ft.

Waverly Township: Wallace Collins 1 Ringel, SW SW SE 12-2s-14w, Traverse 1,246 ft., dry, TD 1,249 ft.

CANADIAN FIELDS

Cretaceous to Be Tested In Clareshom Wildcat

CALGARY.—California-Standard Co. has set string of casing at its Clareshom wildcat in south central Alberta, preliminary to running Lower Cretaceous tests on the basis of results of the electric log run at the hole. Perforating has been carried out and testing is scheduled to commence immediately, to determine possibilities indicated in the Cretaceous sands.

The important venture, 1A Cal-Standard-Clareshom, LSD 3, 12-13-36w4, about 70 miles southeast of Calgary and 7 miles northeast of Clareshom town, originally scheduled as a Madison limestone test, completed drilling at 7,334 ft., but failed to find commercial production at that depth. Electric log was run, and decision to test upper sands was made. Seven-inch string of casing has been set at 3,900 ft., and crew has gun perforated around the interval 3,700-3,900 ft.

Imperial Oil, Ltd., has chalked up a failure in its efforts to define the limits of the rich Devonian coral reef which is the core of Golden Spike oil field. The failure is 6 Imperial-Golden Spike, in LSD 3, 22-51-27w4, $\frac{5}{8}$ mile southwest of Imperial's discovery well. Imperial's score now stands at three oil wells and three stepout failures at Golden Spike.

No. 6 well has ended drilling at 6,455 ft., after failing to find D3 zone, the Devonian reef. It is being electric logged prior to abandonment. No. 6 found the D2 zone of Devonian, but unlike No. 5 well, it was unproductive. In fact D2 zone at No. 6 was located at an elevation of 2,863 ft. below sea level, 188 ft. lower than at No. 5, and a drill-stem test of the interval 5,216-61 ft. gave up a recovery of 90 ft. of mud and 2,250 ft. of salt water.

The 1 Calvan-Pacific-Opal, key "Pacific Group" Redwater west extension test, is being completed as a commercial oil well, according to company officials in Calgary. During swab test the crew recovered 7 bbl. of crude oil hourly with a small trace of brackish salt water. Pump will be installed at the well and further production testing carried out.

The 1 Opal, in LSD 16, 13-58-23w4, is located on an Imperial Oil, Ltd., farmout about $1\frac{3}{4}$ miles due west of the northwest limits of the main Redwater oil field. After showing oil encouragement in the thin D3 section penetrated, the well was completed and cased at 3,356 ft., and then placed on swab tests. Opal topped D3 at 1,224 ft. subsea.

Nineteen more wells completed in Alberta during the past week, boosting total completions since the first of this year to 143. In the week's total are included 12 oil producers, 1 stepout failure and 6 exploratory dry holes. Completion list for the 83-day period January 1 to March 24 now stands at 96 oil wells, 5 natural-gas discovery wells, and 42 dry holes.

Last week's successful oil wells included nine at Redwater, and one each at Excelsior, Leduc, and Stettler. The completion count for this year now stands: Redwater, 62 oil wells and 1 failure; Leduc, 25 oil wells and 3 failures; Excelsior, 4 oil wells and 2 failures; Stettler, 3 oil wells; Golden Spike, 1 oil well and 1 failure; Turner Valley, 1 oil well; 5 natural-gas discoveries; and 35 exploratory dry holes.

UNSUCCESSFUL WILDCATS

Okla-Golden Spike No. 1, LSD 1, 9-52-27w4, TD 6,401 ft.

Imperial-Skaro No. 1, LSD 16, 2-57-20w4, TD 4,007 ft.

Pacific-Deadman No. 1, LSD 8, 32-56-27w4, TD 6,069 ft.

Bailey-Dodds No. 1, LSD 15, 2-49-18w4, TD 4,656 ft.

Hudson's Bay-Sparky No. 2, LSD 2, 27-28-4w4, TD 2,737 ft.

OHIO FIELDS

Brendel Producing Co. Completes Gas Well

COLUMBUS.—The Brendel Producing 3 Stowe-Fuller Co., Section 24, Lawrence Township, Tuscarawas County, south offset to 1 Stoner, logged the red Clinton at 4,775-4,804 ft. with 26,000 cu. ft. of gas and the white Clinton at 4,804-12 ft., with 814,000 cu. ft. of gas, natural. The well was shot with 30 qt. and gaged 970,000 cu. ft. of gas when shut-in with a rock pressure of 1,215 psi.

South Roseville pool in Harrison Township, Perry County, is being extended towards the town of Roseville where Bert Davis and George Sharp have drilled in a well with a very good oil showing. Their 1 Perry Lyle (Stine), Section 4, had the Clinton at 3,490-3,538 ft., filled up 2,700 ft. with oil while drilling in, along with a good flow of gas. The test is to be shot and tubing run.

Centennial Enterprise Co.'s wildcat in Lot 2, Groton Township, Erie County, looks like a failure. They have reached 2,400 ft. and are in the Trenton lime without finding any good showings.

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THE OIL AND GAS JOURNAL

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CALIFORNIA

New Spring Fault Field Gets Second Big Well

LOS ANGELES—The second well completed by D. K. Associates in the new field these operators discovered last month in the Tejon Flats area of Kern County indicates this is the best discovery made in the entire Tejon area where several shallow strikes have been made in the last 2 years.

The new well, 4-28 Corral, 28-11n-18w, came in for 728 bbl. a day of 31.5°-gravity clean oil and 150,000 cu. ft. of gas through a 12 64-in. choke, a better well than the discovery. Total depth is only 1,236 ft., the source of the oil being the Valvulineria California zone of Miocene age. Tubing pressure is 140 psi. and casing pressure 220 psi. The new field, called Springs Fault field, is about 1 mile south of a big wildcat play which Standard of California has just got under way on 7,500 acres, representing farmouts from Reserve Oil & Gas Co. and Richfield Oil Corp.

Ohio Oil Co. has staked location for a wildcat, the 1 Lillis, in the Jacalitos Hills area of Fresno County, Section 28-21s-16e. This falls midway between Jacalitos and Kettleman Hills North Dome fields, and $4\frac{1}{2}$ miles southwest of Guijarral Hills field. Location is also approximately $1\frac{1}{2}$ miles north of Continental Oil Co.'s 1 Kreyenhagen, abandoned in 1940 at 11,020 ft., presumably in upper Cretaceous.

A minor discovery was made during the week in the Tapo Canyon area of Ventura County, one of the oldest producing areas in the state, when John McQuaid brought in 1 Tapo, 13-3n-18w, on the pump for 41 bbl. a day of 21.2°-gravity oil, 1 per cent water cut. The well is between Torrey Canyon on the northwest, Tapo Canyon on the north, and Simi on the south, and is 3 miles from the nearest production.

The Superior Oil Co. has set casing in its 18-2 Government, wildcat in 2-11n-28w, San Luis Obispo County, 3 miles northwest of Russell Ranch field in the Cuyama Valley. Although this is a very tight hole, scouts watching the well report that best showings were found at about 5,300 ft. Tests of a lower interval between 5,760-6,125 ft. resulted in a flow by heads of oil, gas, and water in unknown quantities. Total depth is 6,126 ft. Five miles to the northwest, Universal Consolidated Oil Co.'s 1 S.M.L. Co.-Humble in 24-32s-19e, is drilling below 5,640 ft. in hard tight sand and shale.

Two new Cuyama Valley wildcats were started this week: Texas Co. got under way with its 1 Russell in 21-11n-28w, 3 miles west of Russell Ranch field; Independent Exploration Co. spudded its 71-29 Stubblefield in 29-10n-24w, 15 miles east of South Cuyama field. Douglas Oil Co.'s 85-16 Cuyama wildcat in 16-9n-26w, $2\frac{1}{2}$ miles southeast of the field, is idle at 6,956 ft., but may be deepened.

CALIFORNIA WILDCAT FAILURES

Kern County, Tejon area: Tejon Syndicate 83-11 Tejon, 11-10n-19w, dry, TD 3,390 ft., elev. 1,020 ft.

Los Angeles County, Saugus area: Lytle Exploration Co. 1 Newhall Land & Farming Co., 22-4n-16w, dry, TD 9,735 ft., elev. 1,175 ft.

San Luis Obispo County, North Cuyama Valley area: Richfield Oil Corp. A-2 Florence, 21-11n-27w, dry, TD 4,476 ft., elev. 2,991 ft.

Atascadero area: Tillie Oil Co. 1 Giorgi, 6-29s-13e, dry, TD 415 ft., elev. 1,015 ft.

Sonoma County, Petaluma area: Wa-Me-Co Drilling Co. 1 Sartori, 24-5n-7w, dry, TD 1,896 ft. in gray sand, elev. 275 ft.

Ventura County, Somis area: Humble Oil & Refining Co. C-1 Berylwood Investment Co., 11-2n-20w, dry, TD 7,000 ft., elev. 652 ft.

ILL.-IND.-KY.

Wabash County Wildcat Shows for O'Hara Well

ANOTHER good oil pool for Wabash County, Illinois, appears to have been uncovered by J. F. Balderson and Paul Waterbury at their 1 Guy Mundy, NW NE SW 33-1n-13w. The well, located in the area about 6 miles northwest of Mount Carmel and a mile west of nearest production in the north end of the South Friendsville pool, found excellent saturation in O'Hara lime, logged at 2,653-63 ft. A drill-stem test of this zone gave a good showing of gas and resulted in a recovery of 1,740 ft. of clean oil plus 110 ft. of oil-cut mud and 10 ft. of water. Casing has been run to 2,670 ft. and cable tools are being moved to drill in the test.

Magnolia Petroleum Co. is extending the Kings pool in Jefferson County, Illinois, about $\frac{3}{4}$ mile to the northeast at its 1 Oliver Taylor, NE SE NE 21-3s-3e. Testing Aux Vases sand at 2,705-14 ft., the well swabbed at the rate of 3 bbl. per hour. Pay was shot with 56 qt. of nitro. Pumping equipment has been installed for completion.

Ernest Zink 1 Zigler, SE NE SE 2-4n-5w, a rank wildcat in the extreme eastern part of Daviess County, near the Martin County line, in Indiana, has found good oil showings in Salem lime, topped at 925 ft. and has casing run to top of the pay. The location, about 8 miles north of the town of Loogootee, is more than 10 miles from any other production. Gas showings also were found in the Bethel sand, topped at 430 ft. Hole was drilled with cable tools.

Pumping 15 bbl. of oil and about 10 bbl. of water daily, Robert Jarboe 1 Arthur Harth, SE SE SE 32-5s-3w, has established

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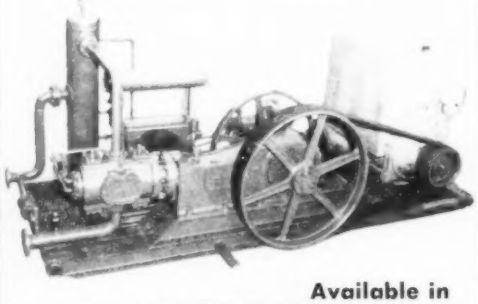

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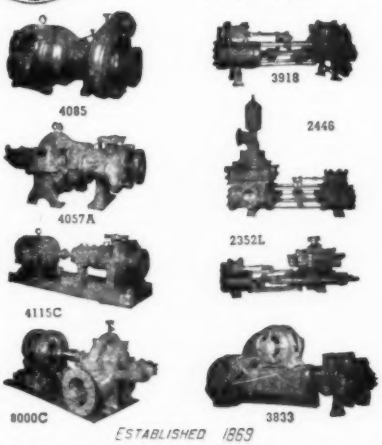

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a new producing area in the extreme eastern part of Perry County, in southern Indiana. Production is from Jackson sand at 467-94 ft. (total depth 573 ft.). The area is about 2 miles north of the East Troy pool.

Production of the Maunie South pool in White County, Illinois, appears to have been extended by C. E. Skiles and E. E. Rehn at their 1 Alford, NE NW NE 18-6s-11e. The well has casing set on top of Cypress sand at 2,594-2,607 ft., in which a drill-stem test, taking in an interval at 2,587-2,607 ft., resulted in a recovery of 480 ft. of oil and 60 ft. of mud-cut oil.

ILLINOIS SUCCESSFUL WILDCATS

Clay County: The Texas Co. 1 Gabbert, NW NE NW 35-4n-5e, IP 5 bbl., Benoist 2,595-2,608 ft., TD 2,891 ft. (New pool.)

Wayne County: Opal Henson 1 Richison, NE SE SE 29-1n-8e, IP 19 bbl., McClosky 2,901-06 ft., TD 2,906 ft. (New pool.)

ILLINOIS WILDCAT FAILURES

Clay County: C. Benson 1 Maxwell, SW SW SE 7-4n-7e, dry, TD 3,024 ft.

Clinton County: P. Doran et al., 1 Johnpeter, NE SW SE 23-1n-3w, dry, TD 1,357 ft.

G. L. Reasor 2 Davis, NE NW NW 3-3n-2w, dry, TD 2,657 ft.

Edgar County: C. B. Anderson, Sr., 1 Huffman, SW SE SE 17-14n-10w, dry, TD 988 ft.

C. S. Levings 1 Hunter, NW NE SE 18-14n-10w, dry, TD 1,015 ft.

Franklin County: W. J. McGlasson 1 Fred Hall, SW NW SW 13-7s-4e, dry, TD 3,211 ft.

Jasper County: G. C. Schoonmaker 1 Ingram, NW NW NW 34-6n-8e, dry, TD 3,172 ft.

Jefferson County: Collins Bros. 1 Payne, NW SE NW 23-2s-2e, dry, TD 2,976 ft.

Lawrence County: Godwin et al., 1 Schick, SW SE SE 20-3n-10w, dry, TD 1,890 ft.

Shelby County: P. Doran 1 Wallace, SW SW NE 2-11n-6e, dry, TD 2,342 ft.

INDIANA WILDCAT FAILURES

Daviess County: F. L. Runyon 1 Powell, SW SW NW 6-4n-6w, dry, TD 1,253 ft.

Parke County: Carter Oil Co. 1 Blair, SW NW SE 30-14n-8w, dry, TD 2,000 ft.

Sullivan County: Ralph Halbert 1 Springerm, SW NW SW 17-7n-9w, dry, TD 2,615 ft.

Warrick County: Fisher Oil Co.-C. E. O'Neal 1 Shumaker, NW SW NE 33-6s-9w, dry, TD 2,234 ft.

WESTERN KENTUCKY WILDCAT FAILURES

McLean County: Damron-Gary et al., 1 Nall, SE NW SW SE 5-L-26, dry, TD 625 ft.

Webster County: Delta Drilling Co. 1 Westerman, NE NW SE 24-N-23, dry, TD 2,708 ft.

EASTERN KENTUCKY

ASHLAND.—On the east end of Furnace gas field and located in 25-P-69, Estill County, Jack Kindred et al have had first showing of oil in the St. Peter sandstone, a formation which hitherto has yielded only gas. Topping the sand at 2,640 ft. on 2 George Lyle, operators had oil from 2,692-2,700 ft. total depth. A fillup of some 600 ft. was reported and tubing and rods were being run for production test.

SOUTHWEST TEXAS

New Pay Opened in LaGloria Field

CORPUS CHRISTI.—New pay has been opened in LaGloria field of Brooks County, with completion of Fidelity Oil & Royalty Co. 1 Otis Cosby. The hole was originally drilled to a depth of 9,015 ft. and abandoned in November 1946. Fidelity perforated at 7,542-47 ft. in the Atlee "G" formation and completed it for 36 bbl. of oil daily with a trace of water through a $^{1}/_{8}$-in. choke. The pay was topped at 7,540 ft. and 7-in. production casing was set at 8,867 ft. for the completion. This new sander is located in Lot 4, Block 5 of the Falfurrias Farm and Garden tracts, approximately $^{2}/_{3}$ mile south of the south flank oil production.

In Hidalgo County, 8 miles south of Pharr, Taylor Refining Co. and Mayfair Minerals, Inc., have abandoned 1 Roy Barnes, wildcat test approximately $^{1}/_{3}$ mile west of the 1 Klump. The same operators' 1 Klump well tested 88 bbl. of oil daily through perforations at 10,190-10,225 ft. on 24-hour drill-stem test. These perforations were plugged after the well stopped flowing 2 days later. Operators have now pulled tubing and will deepen the Klump well. The Barnes well may be reworked later.

C. J. Brown, of Houston, has completed the 1 W. A. Petty for a small oil-discovery well on pump. The producer was completed through open hole from 1,174-1,482 ft. in a Sandy lime section, but no gage has been made yet. It is located in the J. H. Pickens Survey 7, Abstract 17, Fair field area of Bexar County.

Humble Oil & Refining Co. G-4 King Ranch-East Laureles, wildcat test 15 miles south of Corpus Christi, recovered 340 ft. of mud and 2,208 ft. of salt water on drill-stem test at 6,447-64 ft. Operators are now coring at 6,757 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Brooks County: D. J. Moss 1 Mrs. R. A. Myrick, Sur. 132, 23 mi. W of Falfurrias, dry, TD 3,106 ft.

Duval County: Joe C. Palmer et al 2 Welder Ranch, S. Alexander Sur. 102, 10 mi. NE of Freer, dry, TD 2,600 ft.

Texas Co. 1 Duval Co. Ranch Co. O A NCT-5, Pilar Martinez Sur. 104, 9 mi. NEW of Freer, dry, TD 3,300 ft.

Frio County: Alaska Steamship Co., Newman Bros. and Calvert Corp. C-2 Oppenheimer & Lang, John Kettleman Sur. 206, A-441, 12 mi. E of Pearsall, dry, TD 4,220 ft.

Hidalgo County: Taylor Refining Co. and Mayfair Minerals, Inc. 1 Roy Barnes, Porcion 70, 8 mi. S of Pharr, dry, TD 11,610 ft. (This well may be reworked later).

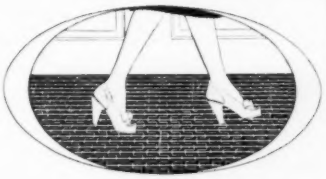
Hogg County: O. W. Killam 1 Holbein Est., Agua Nueva de Arriba Grant, 24 mi. S of Hebbronville, dry, TD 6,576 ft.

Medina County: Zachry & McKinzie 1 Adams, Arbey Sur. 72, 15 mi. NW of Devine, dry, TD 530 ft.

Nueces County: C. G. Glasscock 1 Phil Magee, Lot 12, Block 3, Nueces River Irrigation Park, 1 mi. N of Robstown, dry, TD 7,514 ft.

Williamson County: W. M. Jarrell 1 L. V. Coupland, BBB&C RR Co. Sur., 6 mi. S of Taylor, dry, TD 3,571 ft.

THE SAFE OPEN STEEL FLOORING IS TRI-LOK



No object over $^{1}/_{2}$ square inch can pass through super-safe U-Type Tri-Lok Flooring. Fabricated without bolts, rivets or welds, it is unsurpassed for plant installation, walkways, loading platforms. Efficient distribution of concentrated loads . . . maximum free opening for light and air. Write for Bulletin ML1140.

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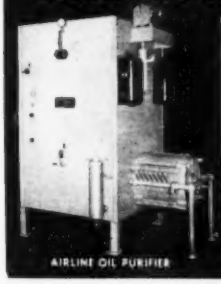

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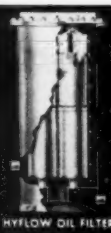
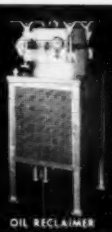
OIL PURIFICATION EQUIPMENT



HYFLOW OIL FILTER



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In Canada: UPTON-BRADEEN-JAMES, Limited, 990 Bay St., Toronto; 3464 Park Ave., Montreal

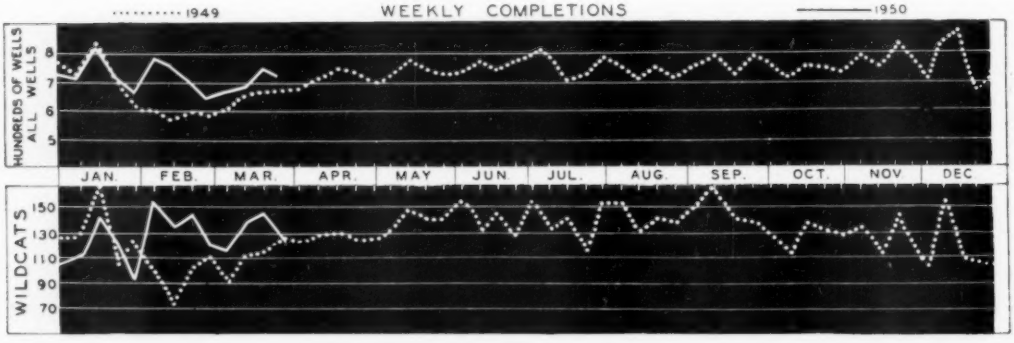
CURRENT STATISTICS

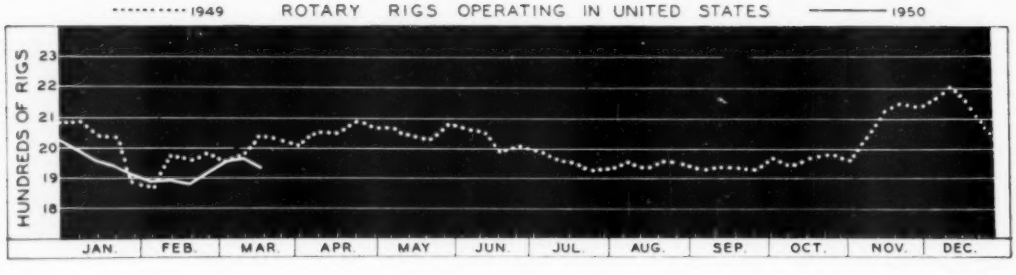
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED MARCH 25, 1950

	Total of all wells					Mar 25		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	10	5	0	*5	14,349	113	319	0	0	0	0	0	0	0	0	0	0
Pennsylvania	16	5	4	*7	27,280	259	537	0	0	0	0	0	0	0	0	0	0
West Virginia	12	6	1	5	22,979	138	115	0	0	1	1	2	0	0	3	5	8
Ohio	15	3	4	†8	30,734	200	268	0	0	0	0	0	1	0	1	2	4
Indiana	31	13	1	17	49,544	241	223	0	0	0	4	4	8	0	1	29	38
Kentucky	22	9	4	9	27,674	188	183	0	0	0	2	2	3	0	0	14	17
Illinois	42	16	1	25	101,562	506	476	2	0	0	10	12	8	0	0	115	123
Michigan	11	4	0	7	32,207	151	190	0	0	0	6	6	8	0	1	66	75
Kansas	72	35	0	37	240,979	773	632	1	0	0	11	12	17	0	1	113	131
Nebraska	2	0	0	2	7,764	17	2	0	0	0	2	2	0	0	1	10	11
Oklahoma	106	60	12	34	420,419	1,102	800	1	0	0	15	16	39	3	4	141	187
Texas	283	181	14	88	1,126,677	3,379	2,883	8	2	2	40	52	95	9	34	541	679
North Central (Dist. 7-B & 9)	99	53	1	45	244,460	1,031	901	5	0	0	16	21	38	1	9	184	232
West (Dist. 7-C & 8)	70	65	0	5	341,658	984	633	0	0	0	3	3	22	1	0	118	141
Panhandle (Dist. 10)	14	10	4	0	42,481	245	233	0	0	0	0	0	1	0	2	6	9
Eastern (Dist. 5, 6, & 6-P)	20	12	3	5	69,972	237	239	0	0	0	4	4	2	1	1	64	68
Gulf Coast (Dist. 2 & 3)	42	18	4	20	241,938	460	403	3	2	2	8	15	16	3	11	65	95
Southwest (Dist. 1 & 4)	38	23	2	13	186,168	422	474	0	0	6	9	9	16	3	11	104	134
Louisiana	46	26	6	14	299,107	525	459	3	0	0	5	8	16	5	3	43	67
Northern	20	10	5	5	62,009	267	235	0	0	0	2	2	3	0	0	21	24
Southern	26	16	1	9	237,098	258	224	3	0	0	3	6	13	5	3	22	43
Arkansas	6	4	0	2	16,575	75	52	0	0	0	0	0	1	0	0	19	20
Mississippi	6	3	0	3	37,838	65	76	0	0	0	2	2	2	1	0	22	25
Southeastern States	0	0	0	0	0	13	11	0	0	0	0	0	0	0	1	9	10
Montana	1	0	0	1	3,058	29	40	0	0	0	0	0	0	0	0	8	8
Wyoming	4	3	1	0	18,399	131	128	0	0	0	0	0	3	0	0	19	22
Colorado-Utah	0	0	0	0	0	15	22	0	0	0	0	0	0	0	0	12	12
New Mexico	12	6	4	2	62,312	150	122	0	0	0	1	1	6	0	0	14	20
California	23	15	1	7	97,134	463	589	0	0	0	6	6	6	0	2	78	86
Miscellaneous	1	0	0	1	5,759	3	13	0	0	0	1	1	0	0	0	3	3
Total United States	721	394	53	274	2,654,350	8,476	8,140	15	2	3	106	126	213	18	52	1,263	1,546
Total previous week	754	416	51	287	2,828,546			18	2	2	123	145	198	16	49	1,157	1,420
Total March 26, 1950	646	381	36	229	2,402,474			25	2	2	98	127	199	16	35	1,139	1,389

Service wells included: *5, †1, 12, §4.





DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 25 crude oil	B.of M. Mar. demand	Mar. 18 crude oil
Alabama	1,300	1,200	2,950
Arkansas	80,700	82,000	80,700
California	861,800	834,000	863,100
Colorado	57,300	67,000	59,900
Eastern	56,700	59,000	56,800
Florida	1,065	1,000	1,100
Illinois	179,100	180,000	177,800
Indiana	26,900	29,000	27,500
Kansas	264,700	285,000	259,700
Kentucky	25,500	25,000	25,700
Louisiana	506,800	544,000	506,750
North Louisiana	116,000		115,950
South Louisiana	390,800		390,800
Michigan	44,800	45,000	43,900
Mississippi	97,700	99,000	97,000
Montana	22,000	25,000	24,100
Nebraska	1,100	700	1,450
New Mexico	129,400	130,000	129,400
Oklahoma	419,950	413,000	418,650
Texas	1,838,450	2,100,000	1,838,450
Dist. 1 (Southwest)	25,850		25,850
Dist. 2 (Southwest)	113,450		113,450
Dist. 4 (Southwest)	181,625		181,625
Dist. 3 (Gulf Coast)	310,775		310,775
Dist. 5 (Eastern)	22,775		22,775
Dist. 6 (Eastern)	76,925		76,925
East Texas field	249,200		249,200
Dist. 7-C (West)	44,475		44,475
Dist. 8 (West)	531,800		531,800
Dist. 7-B (W. Central)	62,325		62,325
Dist. 9 (N. Central)	130,000		130,000
Dist. 10 (Panhandle)	89,250		89,250
Utah	3,000	1,200	2,900
Wyoming	158,100	128,000	159,000
Total United States	*4,776,665	5,050,000	4,776,550
Change from previous week, up 115			
Canada	79,250		75,160

Total U. S. production January 1-March 25 (414,624,665 bbl.
Same period last year (crude plus cond.) 453,299,335 bbl.

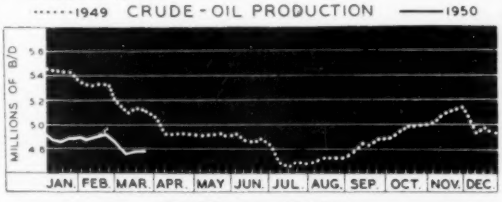
*Not incl. 97,275 bbl. condensate. (Incl. 7,731,570 bbl. condensate.

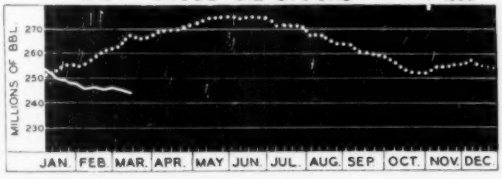
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

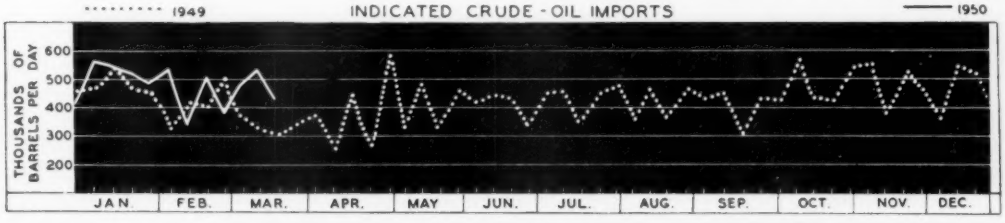
(Thousands of barrels)

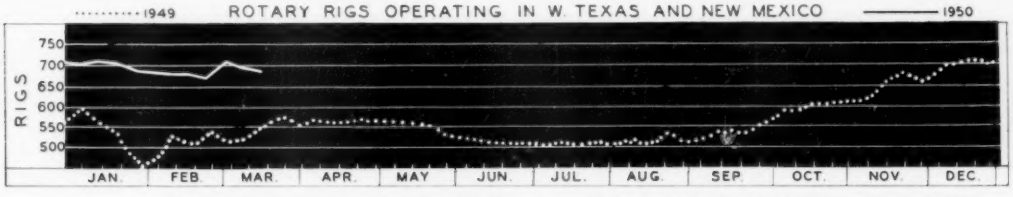
	Mar. 18, 1950	Mar. 11, 1950	Mar. 19, 1949
Pennsylvania	2,817	2,691	2,865
Other Appalachian	1,726	1,588	1,712
Illinois, Indiana, Michigan	10,566	10,894	13,982
Arkansas	3,145	3,192	3,109
Louisiana	16,244	16,191	13,575
North	3,744	3,912	3,519
Gulf	12,500	12,279	10,056
Mississippi	2,711	2,609	3,075
New Mexico	6,920	6,945	7,115
Oklahoma and Kansas	35,285	35,197	38,521
Texas	106,582	107,383	128,505
East Texas	14,356	14,727	16,644
West Texas	37,736	37,117	52,578
Texas Gulf	28,460	29,400	30,178
Other Texas	26,030	26,139	29,105
Rocky Mountain	13,419	13,621	13,012
California	38,185	37,966	33,816
Foreign	6,976	7,425	8,056
Total United States	244,576	245,702	267,343

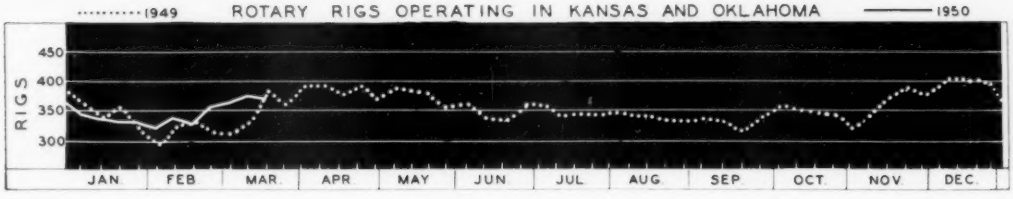
*Bureau of Mines.











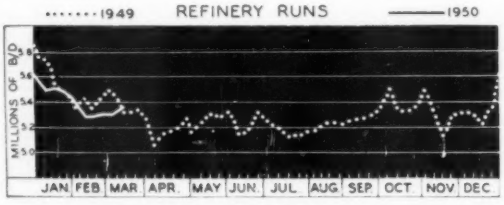
A.P.I. REFINERY REPORT, MARCH 18

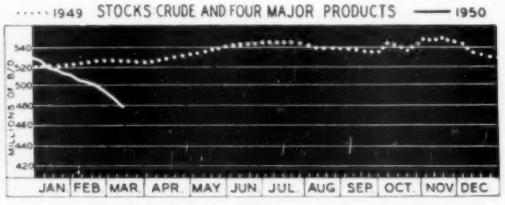
(Thousands of barrels)

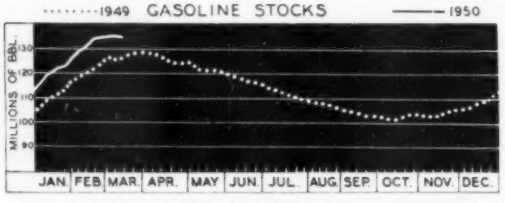
District—	Daily avg. crude runs	Daily average production: Gasoline[a]	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline[b]	Kerosine	Distillate	Residual
East Coast	801	329.4	26.3	181.4	211.3	27,139	5,531	12,073	7,617
Appalachian:									
District 1	87	41.9	6.3	16.1	10.9	2,654	282	351	241
District 2	61	22.7	3.8	8.6	13.0	1,036	68	124	57
Ind., Ill., Ky.	1,052	533.0	60.1	175.3	187.4	28,319	2,058	4,868	2,133
Okla., Kans., Mo.	428	236.3	21.6	91.1	52.1	14,601	303	2,664	759
Inland Texas	199	145.8	9.0	29.7	44.0	4,095	255	701	546
Texas Gulf Coast	1,262	578.7	106.4	213.6	214.4	20,460	2,075	7,949	4,046
La. Gulf Coast	405	197.7	49.0	84.9	43.6	7,071	1,430	2,640	1,947
N. La. and Ark.	79	27.3	7.6	12.9	15.6	3,651	275	488	234
Rocky Mountain:									
New Mexico	9	5.3	.4	1.0	2.1	83	25	72	31
Other Rocky Mtn.	182	84.6	8.6	33.4	34.3	5,300	272	1,406	465
California	816	359.6	5.0	103.9	316.2	20,643	818	9,766	23,890
March 18, 1950	5,381	2,562.3	304.1	951.9	1,144.9	135,052	13,592	43,102	41,966
March 11, 1950	5,314	2,515.4	347.0	892.9	1,172.9	135,284	14,407	46,575	44,544
March 19, 1949	5,335	2,495.7	309.9	967.9	1,201.6	127,310	18,226	50,099	59,234

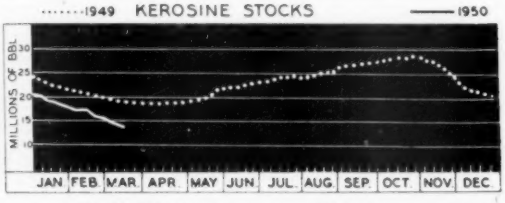
Bureau of Mines, March 1949	Daily avg. crude runs	Daily average production: Gasoline[a]	Kerosine	Distillate	Residual
	768	305.4	27.8	164.6	210.3
	83	40.9	5.0	10.1	11.6
	63	32.9	3.3	6.0	15.1
	886	469.0	57.9	125.1	155.6
	422	218.1	22.6	85.7	73.2
	220	137.1	13.7	20.5	53.3
	1,291	601.9	84.1	233.6	236.3
	433	195.9	47.5	91.3	57.5
	75	27.8	7.9	11.2	16.9
	11	6.4	.4	1.5	3.0
	165	71.3	5.4	30.5	38.8
	933	363.0	13.9	152.6	386.3
	5,352	2,469.7	289.5	932.7	1,257.9

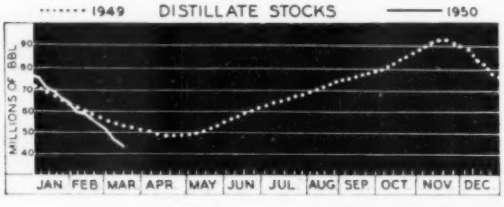
[a]At refineries including natural blended. [b]Finished and unfinished.

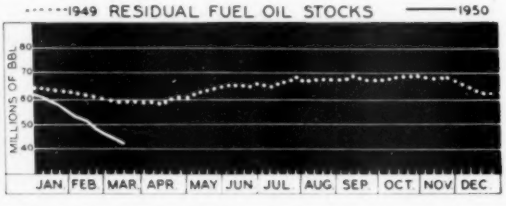


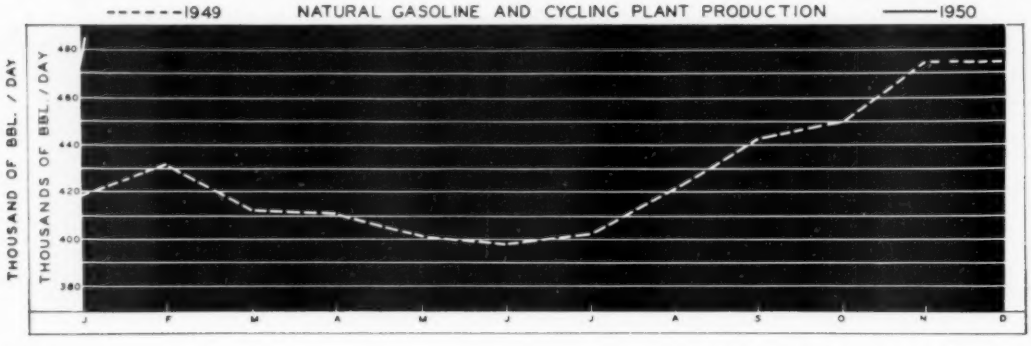












CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.53			
19-19.9	1.63			
20-20.9	1.73	$2.25		$2.12
21-21.9	1.82	2.27		2.14
22-22.9	1.92	2.29		2.16
23-23.9	2.02	2.31		2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.54
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

RECENT adjustments in price schedules for No. 2 fuel by Esso Standard Oil Co. seem to have gone a long way toward clearing the muddied distillate price situation on the East Coast.

Esso and most other major suppliers were posting 7.9 cents a gallon for barge deliveries of No. 2 fuel in New York Harbor but were allowing 0.3 cent a gallon discount. At the same time, some sales were reported at 7.4 cents. Esso's new posting of 7.6 cents does not represent an actual cut in the barge price, and for the present at least, the market seems to have stabilized at that figure.

High demands for light fuels since the last week in February have taken most of the excess distillate stocks in the Gulf-East Coast districts. Indicated refinery demand for distillate fuels in these districts for the 4 weeks ended March 18 increased about 32 per cent over the same period last year. Current refinery production supplied only 55 per cent of this demand, resulting in a stock decrease of over 11,000,000 bbl. In the same period last year, distillate stocks declined only 3,300,000 bbl. in the Gulf-East Coast districts.

Kerosine and heavy-fuel prices remain firm on the New York market. While no price changes were reported for gasoline, there is little activity on the spot market.

In the Mid-Continent area, heavy fuel is tight with continuing reports of premiums offered for low-sulfur material. The high-demand season for distillates is over but most suppliers report additional interest in gasoline as the farming season opens. As yet, there has been little evidence of price reductions at tank-car levels following the lowering of tank-wagon prices.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of March 27, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 74-76 octane	$9^3/_8$-$9^3/_4$	10.375-10.6	9-$9^3/_4$
Premium gasoline, 78-80 octane	$10^3/_8$-$10^3/_4$	11.5-11.6	$9^3/_4$-$10^3/_4$
42-44 w.w. kerosine	$8^1/_2$-$8^5/_8$	8.8	8.8$^1/_2$
No. 2 straw fuel oil	$7^5/_8$-$7^3/_4$	7.6	$6^5/_8$-7
No. 6 residual	$1.50-1.60	$1.90	$1.50-1.60

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4	$3^1/_2$	$3^3/_4$
Grade 18-55	4.8	4.3	4.55

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	12.75
2,000 No. 5-6 neutral	14-14.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	17
200 vis., No. 3 neutral, 0-10 pp.	11.5-12.5

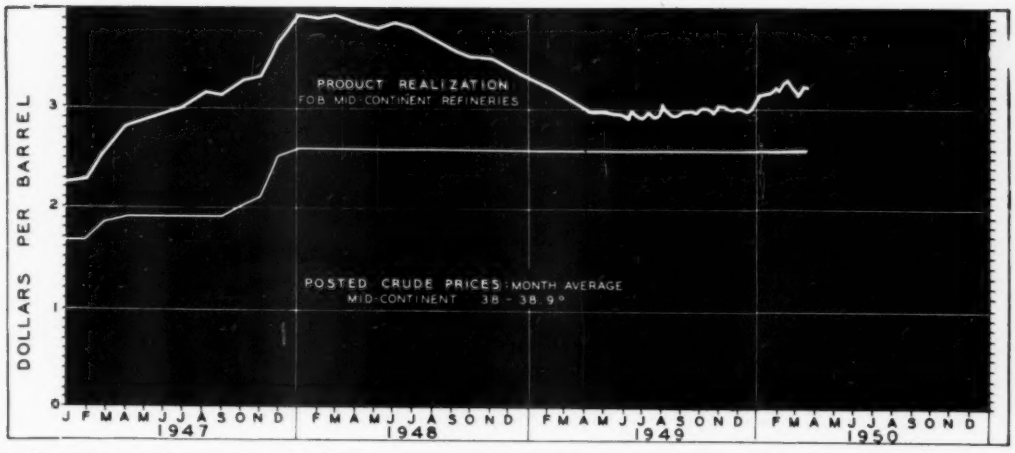
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5-20.5
180 vis., 0 p.t. neutral	20.5-21.5

WAX

Mid-Continent

132-134 A.M.P.	4.25



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

February Gains 436 Completions; Footage Up 2 Million Feet

by Polly DeArmond

THE number of completions during February totaled 2,915, a gain of 436 wells, or 17.6 per cent, over February 1949, and total footage of more than 11 million feet was up some 2 million feet, or 22.5 per cent.

In the cumulative comparison of January-February 1950 against the corresponding period of the previous year, completions rose 351 wells, or 6.2 per cent, and footage increased more than 2 million feet, or 11.3 per cent, this year.

Deep Drilling

The footage increases shown above, and notable gains in the greater depth classifications in both the February-vs.-February and cumulative comparisons, tend to bear out increased drilling in the deeper areas this year as predicted in The Oil and Gas Journal's Annual Number, January 26, 1950. Average depth also increased; for February 1950 it was 3,783 ft. as against 3,631 ft. for that month of last year.

Reported Gains

For February-vs.-February, three areas noted gains in both completions and footage drilled: Oklahoma, Kansas, and Nebraska had an increase of 242 finished wells, or 59.2 per cent, and a 46.3 per cent gain of 701,319 ft. in total footage; the Texas-New Mexico area was up 411 completions, or 48.2 per cent, and 1,756,781 ft., or 46.7 per cent; the Southern states (including Louisiana, Arkansas, Mississippi, Alabama, Florida, and Tennessee) gained 37 wells, or 19.3 per cent, and 101,391 ft., or 8.5 per cent.

The Rocky Mountain region, including Montana, Wyoming, Colorado, Utah, and the Dakotas, completed the same number of wells as in February 1949, but drilled them deeper as reflected by a 17.5 per cent increase of 35,826 ft. in footage.

Area Declines

The greatest decreases occurred in the East and West Coasts. The Appalachian area of New York, Pennsylvania, and West Virginia dropped 155 wells, or 43.6 per cent, and 227,620 ft., or 38.6 per cent from February 1949. The Pacific Coast was off 74 completions, or 35.6 per cent, and 172,955 ft., or 21.8 per cent. The North Central district, made up of Ohio, Indiana, Illinois, Kentucky, and Michigan, decreased 25 wells (6 per cent) and 169,353 ft. (17.8 per cent).

Cumulative Comparisons

The same general areas reflected the gains and losses in the cumulative analysis. The Mid-Continent section (Oklahoma, Kansas, and Nebraska) jumped 35 per cent in wells and 28.7 per cent in footage. Texas-New Mexico increased 22 per cent in completions and 21 per cent in footage. The Southern states and the Rocky Mountain region showed smaller increases in wells and footage. The greatest losses were in the Eastern and Pacific sections, while the North Central district reported small declines in both categories.

SUMMARY OF COMPLETIONS, FEBRUARY 1950

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	42	21	0	21	42	0	0	0	0	0	61,399	161
Pennsylvania	109	52	14	43	98	11	0	0	0	0	186,384	231
West Virginia	49	16	26	7	30	19	0	0	0	0	114,693	157
Ohio	76	22	24	30	38	38	0	0	0	0	175,112	111
Indiana	70	27	3	40	62	8	0	0	0	0	110,704	125
Kentucky	50	23	6	21	45	4	1	0	0	0	70,811	68
Illinois	130	62	0	68	76	54	0	0	0	0	268,164	203
Michigan	64	28	2	34	36	28	0	0	0	0	157,163	120
Kansas	277	128	26	123	58	216	3	0	0	0	891,943	338
Neb., Mo., Iowa	4	2	1	1	1	2	1	0	0	0	13,745	11
Oklahoma	370	235	15	120	105	193	63	5	4	0	1,309,108	714
Texas	1,199	762	42	395	310	463	322	69	31	4	5,206,917	1,248
North	241	124	5	112	115	89	36	1	0	0	748,582	181
West Central	133	55	5	73	46	76	11	0	0	0	426,399	132
West	380	313	0	67	53	117	160	29	18	3	2,026,506	415
Panhandle	71	53	11	7	3	62	3	0	3	0	249,710	81
East	75	47	3	25	23	38	10	3	0	1	284,632	87
Gulf Coast	162	106	11	45	26	40	64	24	8	0	891,273	201
Southwest	137	64	7	66	44	41	38	12	2	0	579,815	151
Louisiana	168	104	12	52	48	26	34	28	27	4	1,007,821	261
Northern	89	54	9	26	46	17	20	5	1	0	329,439	87
Southern	79	50	3	26	2	9	14	24	26	4	678,382	174
Arkansas	29	15	0	14	6	21	1	1	0	0	98,987	26
Mississippi	22	9	0	13	0	0	15	6	1	0	156,191	27
Ala., Ga., Fla.	6	0	1	5	3	1	2	0	0	0	18,672	8
Tennessee	4	0	0	4	4	0	0	0	0	0	6,721	8
Montana	5	1	0	4	2	3	0	0	0	0	13,808	70
Wyoming	40	25	3	12	3	19	13	2	1	2	213,626	90
Colorado	2	0	0	2	0	0	2	0	0	0	13,199	23
Utah	0	0	0	0	0	0	0	0	0	0	0	12
Dakotas	0	0	0	0	0	0	0	0	0	0	0	5
New Mexico	65	42	8	15	16	26	10	9	2	2	312,196	143
California	134	97	2	35	31	63	21	11	6	2	620,447	130
Total February 1950	2,915	1,671	185	1,059	1,014	1,195	488	132	72	14	11,027,811	4,192
Total January 1950	3,102	1,806	224	1,072	1,088	1,290	447	182	85	10	11,636,959	4,349
Total February 1949	2,479	1,414	172	893	886	1,040	316	170	58	9	9,002,422	4,348
Cumulative 1950	6,017	3,477	409	2,131	2,102	2,485	935	314	157	24	22,664,770	
Cumulative 1949	5,666	3,218	376	2,072	2,077	2,309	764	356	142	18	20,352,116	

Incl. 89 service wells: N. Y. 21, Pa. 38, Ohio 2, Ind. 1, Kans. 6, Okla. 12, N. Tex. 8, W. Cent. Tex. 1. †Incl. 26 distillate wells: Okla. 6, W. Tex. 3, E. Tex. 2, Tex. Gulf 2, No. La. 5, So. La. 4, Miss. 2, N. Mex. 2. ‡Incl. all wells rigged up and or drilling at end of month. §Incl. 2 Md. ¶Incl. 2 Idaho. Incl. 3 Wash.

EQUIPMENT MEN . . . in the News

James Made Eastman Vice President for Sales

W. G. JAMES

W. D. COMPTON

William G. James, formerly Gulf Coast division manager for Eastman Oil Well Survey Co., at Houston, has been named vice president in charge of sales for the company, according to an announcement made by H. John Eastman, president.

James has moved to the general office in Denver from where he will direct the company sales division in the Rocky Mountain, Mid-Continent, Gulf Coast, and California areas. One of the pioneers of the Eastman organization, James celebrates his seventeenth anniversary with the company this year.

His first assignment with Eastman was in Long Beach and Huntington Beach fields, from where he was transferred to Houston as field engineer in charge of drilling.

Replacing James as division manager at Houston is William D. Compton, formerly general field engineer for the company with headquarters at Denver. He has been associated with the Eastman company since 1943, when he started as an assistant junior engineer.

Southern Geophysical Co. Opens Midland Office

Establishment of a division office of Southern Geophysical Co. at Midland, Tex., to serve clients in West Texas and New Mexico has been announced by Dr. Sidon Harris, president of the company.

R. E. Davis and Elmer F. Blake are supervisors in charge of the office. Eleven seismograph field parties are now being operated by Southern Geophysical Co. in the Southwest and since the establishment of this company in 1945, there have been 17 commercial producing oil fields discovered following surveys made by Southern.

Working closely with the staff at Midland and all southern crews is a central office of seismologists, computers, and draftsmen in the Fort Worth headquarters.

T. A. Ramey Joins Ideco M & E Division

George W. Walton, executive vice president of International Derrick & Equipment Co., recently announced that T. A. (Tom) Ramey, formerly sales manager for Unit Rig & Equipment Co., has joined the Ideco Mechanical and Export Division as general manager of domestic sales.

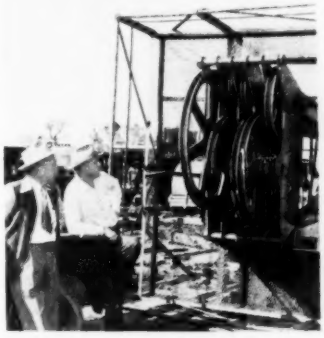
Ramey has had 16 years' experience in oil-field-equipment sales engineering. A petroleum-engineering graduate of University of Southern California, he joined National Supply Co. in California in 1934. He spent a training period in the Torrance plant and in the supply-store organization, later becoming a field engineer.

Going to the Texas division in 1937, Ramey served National as a factory liaison engineer. In 1940 he transferred to the southern division of National as a specialist in rotary-drilling equipment. Leaving in 1947, he joined Unit Rig as sales manager.

General Controls to Start Construction of New Plant

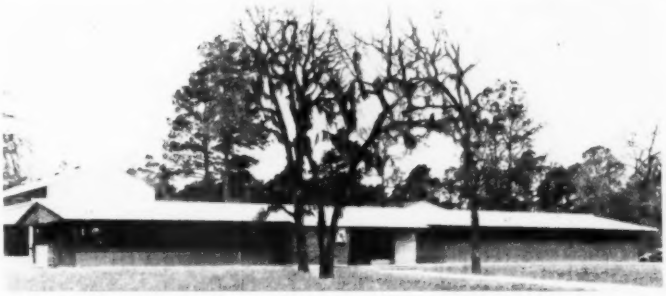
Construction has started on a large addition valued in excess of $100,000 at the General Controls plant, Glendale, Calif. President W. A. Ray stated that the new facilities will be devoted to assembly operations of the company's automatic pressure, temperature, level, and flow controls.

Portable Crown Block Aids Drilling Efficiency



S. O. Hollingsworth, Bakersfield yard superintendent, Rocky Mountain Drilling Co., and J. W. Thatch, manager of the Bakersfield division of Regan Forge & Engineering Co., inspect one of eight recently installed Regan portable crown blocks.

Crutcher-Rolfs-Cummings Occupies New Headquarters



Crutcher-Rolfs-Cummings, Inc., Houston and Tulsa, pipe-line-equipment manufacturers and suppliers, has moved into this new headquarters building, located at the Houston plant. The building contains about 4,515 sq. ft. of floor space. The east wing houses the accounting and purchasing departments and the west wing includes private offices and a conference room.

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EQUIPMENT FOR SALE

FOR SALE: 1—36-L Bucyrus Rig, 1948 model, complete with all tools. Phone 2032, Henderson, Kentucky.

FOR SALE: Two steel mud tanks, 5 feet by 8 feet; 30 feet long, made of ¼" steel, sloping bottom. Never been used. $3200. Located Makin Drilling Company's yard, Hobbs, New Mexico.

TUBING: Hard drawn copper, finned, mfg'd by Rome-Turney, new, ⅝" OD x .049" wall, lengths 6', 7' and 8'—approximately 150,000' Total. Julius M. Fogelman, Reading, Pa.

CATERPILLAR D-17000 ENGINES

Two complete skid mounted units used less than 30 days. V-Belt equipped.

Alfred B. Kern
223 Wright Bldg.
Tulsa, Oklahoma

FOR SALE

GRINDING MACHINES FOR RECLAIMING USED STAINLESS STEEL BALL VALVE SEATS FROM ¾" TO 2¼" BALL SIZES. SAVE 75%. WRITE FOR DETAILS.

THE BALL VALVE SEAT GRINDER CO.
102 Jamesville Rd.
DeWitt, New York
(Suburb of Syracuse)

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FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 167, Red Fork Station, Tulsa, Oklahoma

BESSEMER TYPE 10-80 HP Direct Driven Compressor. Choice of high or low pressure cylinders. Patton and Swab, Inc., Citizens Bank Bldg., Phone 3-3181, Tulsa.

FOR SALE: In West Texas, Model 61 Wichita Spudder, complete with 130 H.P., LeRoi Drilling Engine, all tools, dog house, light plant, and Shear Pole Mast. Rig is mounted on 12" I Beam Skids. Box D-228, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

TWO CARDWELL DOUBLE-DRUM SPUDDERS: All tools, light plants, doghouses, portable masts. Also 96' Portable Drill Mast with 4½' sub-structure. Wallace, Box 4563, Oklahoma City, Okla. Phone 62-2415.

FOR SALE: ½ yard K-12 Insley with complete trench hoe attachment. Diesel engine, extra long and extra wide (swamp) tracks, also 35 ft. dragline boom with fairleads, in absolutely first-class condition. $7,000.00. C. W. Sternberg, Box 8188, Houston, Texas. Phones Justin 1984, South Houston 7651.

BROWN STRAUSS CORP.

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Dismantling Two Major Oil Refineries

Unusual opportunity to pick up real bargains. Everything offered either in place, or knocked down ready to ship. Never before have prices been so low. Contact us at once for your needs, and get our prices.

1—55,000-Bbl. Riveted Steel Tank
1—37,500-Bbl. " " "
4—15,000-Bbl. " " "
7—10,000-Bbl. " " "
4— 5,000-Bbl. " " "
1— 4,800-Bbl. " " "
1— 4,300-Bbl. " " "
8— 3,775-Bbl. " " "
16— 3,500-Bbl. " " "
4— 3,100-Bbl. " " "
2— 2,700-Bbl. " " "
11— 2,000-Bbl. " " "
4— 1,600-Bbl. " " "
4— 1,500-Bbl. " " "
2— 1,100-Bbl. " " "
4— 1,000-Bbl. " " "
2— 350-Bbl. " " "
1— 300-Bbl. " " "
2—Spheroid Tanks—Riv., 750-Bbl. Capacity

PRESSURE TANKS AND VESSELS

5—10' x 30' x ½" thickness Capacity 18,000-Gal., Riv.
1—3' x 32' x 4" F.S. Reaction chamber 1" concrete-lined
1—10' x 32' x 1¾" Riveted and Welded Reaction Chamber, Heads 1⅜"
2—9' x 33' x 1⅛" Riveted and Welded Reaction Chamber, Heads 1⅞
1—9' x 39' x 1⅛" Riveted and Welded Reaction Chamber, Heads 1⅞
1—6' x 35' x 1"—200 PSI Reaction Chamber, F.S. Flgd. Heads
2—4' x 21' x 1" Flgd. Hd. Reaction chamber, F.S. Flgd. Heads

Many other Vessels ½" Wall Thickness and heavier, 3' to 8' Diameter, 6' to 24' long.

Centrifugal Pumps—1, 2 & 3-stage; direct connected to electric motors and steam turbines

Steam-driven Air Compressors

Reciprocating Pumps—Steam and electric-driven, for Hot Oil, Products, Boiler Feed, Fire-Fighting and Water Pumps—sizes from 3x2x4 to 18x24x24—Gould Vertical Triplex Pump

2—AC Generators & Exciters, 125 KVA, 2400 volts, 30 Amps., 900 RPM

Heat Exchangers—List on application

Horizontal Steel Storage Tanks—3'x10' to 9'x23'—thickness ¼, ⅜ and ½"

Cast Iron & Steel Pipe—Valves, sizes 2" to 24"—Fittings—every size and kind. Cast Iron, Steel and Flanged

Steel Clothes Lockers, sets, from 2 to 10, sizes 15"x18"x6' high

2—250 H.P. Heine Water Tube Boilers, approved for 170± pressure

Flash Tower 10'x40'—13/16" thick x 1" head. Riv., upper part stainless steel-lined, 3 trays, 63 Bubble caps per tray, 75 PSI, 750 degrees

Other Towers—3'6"x50' to 10'x52', all with trays—
Absorbers, Dephlegmators, Evaporators, Bubble and Vacuum Towers

15,000 ft. 4½" O.D. Seamless Steel Pipe approx. 30 ft. lengths. Plain ends, weight per ft. 14.5±. Used but in excellent condition. Offered at a very attractive price.

Many other items too numerous to list. Write for booklet, or arrange for personal inspection.

EQUIPMENT FOR SALE

FOR SALE: 5½ Keystone, complete with all tools, in good shape; two trucks and two shallow producing wells in center of 640 acres. Shallow wells fully equipped and pumping. Inland Oil Co., 1940 Mentor, Wichita, Kansas.

FOR SALE: One Gardner-Denver Horizontal Drilling Engine 12X12 DEA equipped with Roller Drive Chain for high speed use. Very good condition. A bargain for immediate shipment. Write Union Grove Hemp Co., Union Grove, Wis.

FOR SALE

NEW—Less than 50% replacement cost.

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Motors & Controls — Condulets
Rotameters 3"—$60.00 Telephones—$110.00
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SEAMLESS TUBING

21,000 ft. 5½" OD
55,000 ft. 4" OD
75,000 ft. 3¼" OD
55,000 ft. 2¼" OD
120,000 ft. 2" OD
95,000 ft. 1½" OD

Single or double random lengths. Lowest prices for immediate delivery from warehouse stocks.

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SPECIAL OFFERING
TOWERS—A-1 Condition
Immediate Delivery

One Stripper Column—12' I.D. x 66' tangent to tangent x ¾" thick shell and heads, ASME-API code constructed stress relieved and radiographed, 29 Carbon Steel trays and caps on 2' spacing, 100# @ 200° F., mounted on 12' I.D. x 9'4" high x ⅝" thick skirt.

Two Extractor Columns, 12'6" I.D. x 85'5" tangent to tangent x 1" thick shell x ⅝" thick hemispherical heads, 40 Carbon Steel trays on 2' spacing, 150# @ 300° F., radiographed, mounted on 12'6" I.D. x 16'7" high skirt.

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DULIEN STEEL PRODUCTS, INC.
of Washington
P. O. BOX 667
COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES. E. A. KELLY, BOX 861, OKLAHOMA CITY, PHONE 5-6407.

FOR SALE: Near Holdenville, Oklahoma, one angle iron fabricated 5-car steel loading rack. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE—One used Patterson rebuilt 27" round rail 72 chamber filter press with 2½" feed end opening, good condition. American Liberty Oil Company, Box 1011, Mt. Pleasant, Texas.

FOR SALE: 5½ Keystone Rig—A1 condition, calf wheels, with or without tools. Would trade for 72 speed Star and pay difference. Boyer Oil Company, Box 35, Iola, Kansas.

MODERN
DIESEL GENERATING PLANT

300 HP used Fairbanks-Morse Diesel engine, model 32-E-14, serial No. 795310, direct connected to 200 KW Fairbanks-Morse generator, .8 PF., 3 phase, 60 cycle, 240 volt (can be reconnected to 440 volt). Complete with switch gear, starting equipment, pumps, enclosed cooling system, circuit breaker, silencer and stack.

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Manufactured by Smith Meter Co., Los Angeles.

Dial registers up to 2,000 gallons. Counter registers up to 9,999,999 gallons. Equipped with dial and counter reset lever.

Meter working capacity 50 PSI and 100 GPM. 2" flange connection. Heavy cast aluminum dial and body.

Meters are used but reconditioned and sold with money back guarantee of satisfaction. Weighs 60 lbs. Government cost over $200.00. **Your cost only $49.59 FOB. Tulsa.**

Write for catalog covering over 5000 pressure gauges made by Marsh, U. S. Gauge, Ashcroft, etc. Available at a fraction of your current cost.

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EQUIPMENT FOR SALE

NATIONAL "50" Compound Double Drum Rig 126' Cantilever Ideco Mast, 10' substructure, 6,000' 4½" drill pipe, this rig complete and in excellent condition. P.O. Box 205 Sta. B, Bakersfield, California.

FOR SALE: Two used 5,000 Bbl. Bolted Steel Tanks with stairway. $3,400 for them knocked-down. Hawkins, Texas. Hanson Tank Company, Box 428, Kilgore, Texas.

FOR SALE at Barnsdall, Oklahoma, 5" x 16" Goulds Fig. 1585, Vertical Triplex Single Acting Pump, 5,000 BPD, 800# WP. Price $500.00. Suitable for water flood project. Cities Service Oil Co., Patridge, Bartlesville.

FOR SALE: Wilson mogul drilling rig with portable derrick complete. Suitable for 4500' depth. Now running in Bebee Field, Pontotoc County, Oklahoma. Contract available. Lake Oil Company, Ada, Oklahoma.

MERCOID CONTROLS No. 848, Adj. 20 to 750 lbs. New in factory sealed cartons. $7.50 each; lots of ten, $5.00 each. Wade Machine Shop, Bartlesville, Oklahoma.

FOR SALE

25,000' 2⅜" OD 4.6# Seamless Non-Upset Tubing Range 2
50,000' 2⅜" OD 4.70# E.U.E. J-55 Tubing Range 2
20,000' 2⅞" OD 6.50# E.U.E. J-55 Tubing Range 2
1,560' 13⅜" OD 54.5# New E.W. Range 3 Casing T&C
13,000' 13⅜" OD X .380" Wall 53# New E.W. 40' P.E. (Excellent for 12" Line) $2.65 per foot, FOB Chicago, Illinois.
49,500' 14" OD X .375" Wall 54# New Seamless P.E. Range 2 and 3. All material subject to prior sale.

Other sizes of casing and line pipe available for immediate delivery. Write—wire—Phone for quotations.

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Used Rigs

1—Mogul Single Drum Drilling Rig, GEU-145 Waukesha Engine, American Simplematic Cathead. (Located Carmi, Ill.) This rig is a real bargain $7,000.00

1—Giant Model Draw Works, old style, 2 Waukesha WAKU Engines .. $10,000.00

1—Single Engine Giant Draw Works, #6307, Mogul Transmission, Circulating Water Cooled Brakes, Friction Rotary Drive, Foster Catheads. Good Condition. Set for mounting Waukesha NKU Engine $6,500.00

Wilson Manufacturing Co., Inc.

Wichita Falls, Texas

Phone L.D. 11

EQUIPMENT FOR SALE

SEISMOGRAPH EQUIPMENT FOR SALE: Two 2-Ton Chevrolet Coleman 4-Wheel Drive water trucks. 500 gallon tank completely winterized, vacuum fill, Tulsa winch, etc. Excellent condition, low mileage. Original Cost $6600.00 — Sale Price $4000.00.

One ½-Ton Chevrolet crew and field service unit. Bed enclosed with steel, cab with heater, 65 gallon gas tank with gear pump. 7:50 x 15 tires. Low mileage. Original Cost $2800.00—Sale Price $1800.00. Riverside-6811, Dallas, Texas.

FOR SALE: Approximately 10,000 feet of 6" OD "Invasion" Steel Pipe, Wt. about 9#, $6^5/_8$" OD Plain Ends, 20' lengths. New condition. Also, approximately 15,000 feet of $6^5/_8$" OD Plain End Standard Black Steel Pipe, No. 2 Grade. Price, 65c per ft., FOB Monroe, La. M. KAPLAN & SON, Box 1883, Phone 942, Monroe, Louisiana.

SURPLUS Cast Iron flanged pipe and fittings, assorted sizes. One 440,000 gallon steel standpipe, 30 feet in diameter, 120 feet high, 5 foot rings. For additional information contact A. M. McBrayer, Purchasing Agent, Room 203 Municipal Bldg., Muskogee, Oklahoma.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

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ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

STEEL STORAGE TANKS

Railroad Tank Car Tanks. 6,500 to 12,000 Gal. Cap. Coiled and Non-Coiled

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Heavier—Safer—Cheaper
Other Tanks, Too.

Also — Complete Tank Cars 8,000 and 10,000-Gal. Cap.

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The Neo-Flex Flexible Coupling, to solve your direct shaft coupling problems. The product of years of research and testing, the Neo-Flex Coupling is designed to solve the problems common to direct shaft drives. They permit the correct amount of movement between shafts and eliminate backlash, vibration, bearing strain, drag and power loss.

For prices and sizes write.

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1200 No. Lansing St., Mt. Pleasant, Mich.

Distributors Wanted

EQUIPMENT FOR SALE

FOR SALE—127' "Oilwell" Drilling Mast, 515,000 capacity, complete with six-foot substructure. Call or write H. Waggoner, Phone 64-1413, or P.O. Box 4657, Oklahoma City, Okla.

STEEL BUILDINGS—Any size, any type. All-bolted construction for greater strength at lower cost. Easy to put up, take down, move from one job to another. Ideal for oil field use; fast delivery. Tell us what you need—our low quotation will surprise you. Write today. Herrmann Company, 255 South 5th, Kansas City, Kansas.

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(SUBJECT TO PRIOR SALE)

3 Bolted tanks, 2 in original crates and one assembled, (100 Bbl.). 69'-14" 57# Drive Pipe; 170'-$10^3/_4$" 41# Drive Pipe; 407'-$10^3/_4$" 32.75# Casing 8Rd. Thd. Smls.; 3045'-8" 24# Casing 8Rd. Thd. Smls.; 6286'-7" 23# Casing 8Rd. Thd. Smls.; 8101'-3" 9.20# Tubing Smls.; 1453'-$2^1/_2$" Tubing EUE Smls.; 14,226'-2" 6.40# Regular 10Rd. Thd.; 375'-3^4" Pumping rods; 9-5" Orbit Gate Valves; 9-3" Orbit Gate Valves; 3-2" Orbit Gate Valves; 3-$2^7/_8$" x 6" Parmco Combination Packer; 1-$2^7/_8$" x 6" Larkin Screw Trip Packer; 1-3" x 6" Parmco Packer; 1-$2^7/_8$" x 6" Gas Anchor Packer. M. B. Belden Office at 425 2nd St. N. W., Canton 2, Ohio. Phone 4-6147.

BLOCKS AND HOOKS: Used Ideal sheaves 20" with $5^1/_2$" spring roller-bearing hook, good condition—$475.00 (less than ⅓ new cost). Nearly all sizes good used blocks and hooks in stock. Pressey & Son, Pueblo, Colorado.

12,000' New 2" Galv. Line Pipe, 6 miles 2" used line pipe perfect, 2 miles used 3" 8-thd. line pipe perfect. Molk Petroleum Co., Box 208, El Dorado, Kansas.

FOR SALE: One Wichita 66 Spudder and two D-13000 Caterpillar Diesel Motors. Excellent condition. For further information, call or write Harold Montgomery, Box 748, Farmington, New Mexico.

FOR SALE: Two complete electrical generating units; 100 kw., 480 volts; 3 phase, each unit equipped with 120 hp. Superior Twin Cylinder Horizontal Gas-Diesel engines, including V-Belt drive, control panel and accessories. In good condition, major oil company. For information write Box D-435, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 2500' $2^3/_8$" internal up-set drill pipe. Oversize tool joints with Hughes Acme thread. OD of tool joints $3^3/_8$". Pipe and tool joints practically new. 700 gal. glass insulated water tank with skids. Just the thing for Northwest and Canadian seismic and core drilling use. Clemens Exploration, Box 136, Princeton, Indiana.

FOR SALE: Two 6-cylinder Hydraulic casing pulling machines. One 7", 5", 3" seven foot jacks; one 5", 3" four foot jacks. All in A-1 condition. Box D-422, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 3 New 10,000 bbl. API Columbian bolted steel tanks. 160—8000 & 10,000 gal. tank cars. Darien Corp., 60 E. 42nd St., N.Y., N.Y.

ONE Skid mounted 5 x 10 Gardner Denver Pump with 525 Buda Engine used to drill five shallow holes—$3000.00. Riverside-6811, Dallas, Texas.

2508' 7"-24 lbs. Range 2 Seamless casing, price $1.60 ft. Chase, Kansas. First-class condition. Jay Kornfeld, 1121 Union National Bank Bldg., Wichita, Kansas.

EQUIPMENT FOR SALE

FOR SALE: 1500 ft. core drilling rig complete with drill pipe and water truck. Box D-426, The Oil and Gas Journal, Tulsa, Oklahoma.

WAR SURPLUS MACHINERY

Gaso, Byron Jackson, Aurora, Wayne, Lombard, & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

EQUIPMENT WANTED

WANTED: 1,000 feet of Failing $2^1/_8$" exploration drill pipe and one $7^1/_4$ x 10 Gardner-Denver mud pump or equal. Sutter Well Works, Pass Christian, Miss.

WANTED TO BUY: Double drum well servicing unit, spudding attachment, telescope pole, 50 or 60 ft. length mounted on truck. Phone 183-J, Haskell, Okla., or P.O. Box 433, Haskell, Okla.

WANTED: 43 Star Spudder with tools, in good condition. Address: C. C. Harmon, Box 867, Tulsa, Oklahoma.

WANTED to purchase a steel building to use as a garage, width 60 ft. or wider and 100 to 140 ft. long. Give full description and price. Box D-423, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

Centrifugal pump that will handle maximum 800 to 1,000 bbls. crude oil per hour and 400# discharge pressure to connect to 125 or 150 h.p. electric motor. Full 440-220 volts. Phone or wire

O. M. MILLIORN,
BELL GENERAL PIPE LINE CO.
Gladewater, Texas, Phone 435.

INTERESTED in small portable double-mast rig, capable of drilling to approximately 2000 feet, with or without drill pipe. Equipment must be in good condition and reasonably priced. Preferably located in Southwest Texas. Contact:

MAKIN DRILLING COMPANY
Box 131, Hobbs, New Mexico, Phone 131

HELP WANTED

PIPE LINE INSPECTORS needed immediately for arc welding, lay, ditch, paint, lowering-in; only those with main line experience accepted; job located in mid-west. Write full experience. Box D-424, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Salesmen in essential areas to call on production superintendents. Write for particulars. The Ball Valve Seat Grinder Co., 102 Jamesville Road, DeWitt, New York (Suburb of Syracuse).

HIGH type, responsible executive wanted as Manager Latin-American operations for substantial independent producing company entering foreign operations. Applicant should be college graduate, under 40 years of age; have minimum 15 years' experience in production and drilling work, particularly in high pressure oil and gas well completions. Applicant should speak Spanish fluently, have thorough experience in development Geology, be equipped to prepare and maintain adequate reservoir and engineering studies including repressuring and pressure maintenance. Excellent compensation. When replying, give full details. Our present employes not considered for this position. Box D-364, The Oil and Gas Journal, Tulsa, Oklahoma.

SURVEYOR

Strong independent oil company operating in Southwest Texas has permanent responsible position for qualified surveyor or civil engineer with experience in making pipe line surveys, well locations and property surveys. Must also be competent and fast draftsman since work will be split between field and office. Must have pleasant personality and be adaptable. Ex G. I. 35 years of age or under preferred. Address Box D-432, The Oil and Gas Journal, Tulsa, Okla., giving complete resume of experience, training, salaries, references, samples of drafting, availability. Replies will be held in confidence.

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4—12' x 35' Riveted Tanks
4—5' x 20' Welded Tanks
2—8' x 15' Welded Tanks
3—15' x 35' Riveted Tanks
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3—15' x 8' Bolted Tanks with walkways. Near Bristow, Okla.
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7—Viking Hydraulic Pumps mounted on steel tanks with motors
2—Worthington 6 x 8 Centrifugal Pumps

Contact Carl Elgin at
NOWATA PIPE & SUPPLY CO.
Phone 201, Nowata, Okla.

HELP WANTED

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ENGINEER: Graduate mechanical engineer with good knowledge of industrial power equipment. Must have several years' experience in industrial lubricants sales and engineering. Give full information and salary required. Replies confidential. Box D-434, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

FOREIGN and Domestic Oil Employment Directory (including late supplement of oil companies and drilling contractors in Western Canada). Over 500 listings in drilling, production, refinery, natural gasoline, pipelines, geological, exploration, supplies, manufacturers, services and refinery and pipeline contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 30th year)

SITUATIONS WANTED

PURCHASING Agent, thoroughly experienced. Also Right of Way procurement and Accounting and Auditing. Age 42. Prefer west coast. Box D-415, The Oil and Gas Journal, Tulsa, Oklahoma.

TREASURER - COMPTROLLER - EXECUTIVE ACCOUNTANT. Fifteen years experience accounting and taxation, CPA, Member AIA, some legal training. Desires change. Box D-419, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER: REGISTERED professional engineer with college degree. Design, sales and field experience with drilling and production oil field equipment. Desires a sales position in the Southwest. Box D-383, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

SUPERINTENDENT, Process supervisor, chemist, experienced in complete refinery operations. Desires change. Familiar with distillation, cracking, reforming, polymerization, and treating. 17 years experience. Proven administrative and technical ability, considerable attention given to cost analysis. Box D-440, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Fifteen years varied experience with major company desires position with Independent concern. Box D-439, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER: 13 years experience, drilling, completion, production, and work-over, Mid-Continent and Gulf Coast areas. Box D-431, The Oil and Gas Journal, Tulsa, Oklahoma.

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INVESTMENT—Never before in the oil and gas industry has private capital had the opportunity to play safe and receive a dividend from leasing, drilling, producing. Positive surface deduction eliminates all failures. Owned and directed by one person, expansion has no limit. Details of proof and percentage of dividend for investor on request. A special service to producers seeking positive expansion, fees based on production basis. Box D-429, The Oil and Gas Journal, Tulsa, Oklahoma.

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FOR DRILLING DEALS,
LEASES ROYALTIES

OWN in fee several thousand acres of land located in South Texas close to producing oil fields. Commands favorable geology. Holder would consider accepting treasury stock in a developing organization for a lease contract. Address Opportunity: Box D-438, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL BUY lease block 1000 acres or more with good geology for 4000 foot production. Give full information, geology and price. Box D-437, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING BLOCK: Will sell for cash or small override and cash, 4,000 acre block in Hancock County, Kentucky. In midst of real activity. Whole county now being seismographed. No other acreage of this size available. No deep tests ever made. Will sell as whole or in parts. Box D-436, The Oil and Gas Journal, Tulsa, Oklahoma.

2000 ACRE gas structure, geology. Market 24c thousand. Town 6000 people. Want drilled. G. Eastman, Milner Hotel, Kansas City, Missouri.

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky. W. P. Harley, Bowling Green, Kentucky.

WE BUY PRODUCING
Oil and Gas Leases. Drilling Deals also considered. State complete details in letter to be held in strictest confidence. Box D-380, The Oil and Gas Journal, Tulsa, Oklahoma

WEST TEXAS DRILLING BLOCKS
We have six large drilling blocks in West Texas and New Mexico to sell. Details on request. We also have many cheap minerals and royalties. Navarro Royalties Company, Odessa, Texas.

TENNESSEE—88,200 acres timber land—$3.50 per acre, all minerals included. Details: Earl Jester, 12744 Vanowen, North Hollywood, Calif.

INTERESTED IN DRILLING BLOCKS OF TEN THOUSAND OR MORE ACRES IN NORTH DAKOTA.

M. B. RUDMAN
816 Mercantile Bank Bldg.
Dallas, Texas

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Landowner wishes to sell part of his minerals in large ranch. For price and information write:

Box D-430
The Oil and Gas Journal, Tulsa, Okla.

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Bought and Sold—Any Area
Inquiries Invited

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Bought direct for you on your purchase order. Our lease block map and reprint of press and magazine articles clearly outlining this play mailed on request.

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JOHN ALLEN or BILL McBIRNEY
Suite 200, Grand Pacific Hotel
Bismarck, North Dakota

(Member National Oil Scouts and Landmen Association. References exchanged).

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana

FOR SALE: Producing oil and gas wells in Kansas, payout 25%, on annual investment; leases and royalties in Nebraska. Inland Oil Co., 1940 Mentor, Wichita, Kansas.

WESTERN NEBRASKA
Oil, gas royalty in proven Cheyenne County or nearby wildcat. Write, wire, phone. Smith-Enders Land Co., Kimball, Nebraska.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

REAL ESTATE

315 ACRE black land stock farm with $15,000.00 improvements. All conveniences. On Highway 77 at Milford, Ellis County, Texas. Price $30,000.00. E. P. Harbin, Waxahachie, Texas.

27,000 ACRE RANCH
Las Animas Co., Colo. Watered by wells, live springs. Improved. Handle 1200 cattle. Some oil possibilities. Not leased. $10 per acre. Speakman, 1326 E. Kiowa, Colorado Springs, Colo.

PRODUCTION FOR SALE

FOR SALE: 5 Rosiclaire wells in Mattoon Field, Illinois, closely situated—good equipment—producing 13 barrels per day. Box D-418, The Oil and Gas Journal, Tulsa, Oklahoma.

SHALLOW OLD PRODUCTION, 250 feet 12 wells, lime production, eight bbls. a day; Bowling Green, Kentucky. Joseph Thomas, 30 Radnor Circle, Grosse Pointe 30, Michigan.

WANTED

DRILLING DEALS, proven and semi-proven acreage wanted. Also royalties and producing properties. Send full particulars in first letter to P. O. Box 2161, Cincinnati 1, Ohio.

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Will buy producing properties in Texas and or Oklahoma. Must deal direct with owner. Mail description data to: Box D-433, The Oil and Gas Journal, Tulsa, Oklahoma.

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Insurance Company Money

HALL INVESTMENT COMPANY
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Phone 2-6167

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CALENDAR

April

American Petroleum Institute, board of directors meeting, Houston, April 3-4.

National Association of Corrosion Engineers, annual conference, Jefferson Hotel St. Louis, Mo., April 4-7.

American Chemical Society, Philadelphia meeting, Philadelphia, April 9-13.

American Society of Lubrication Engineers, annual convention, Hotel Statler, Detroit, April 10-12.

American Society of Mechanical Engineers, Hotel Statler, Washington, D. C., April 10-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla., April 11-13.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 12-14.

American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone Hotel, Casper, Wyo. April 13-14.

American Chemical Society, Detroit meeting, Detroit, April 16-20.

Petroleum Industry Electrical Association and Petroleum Electric Supply Association joint conference, Shamrock Hotel, Houston April 18-20.

Natural Gasoline Association of America annual convention, Texas Hotel, Fort Worth, April 24-26.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Stevens Hotel, Chicago, April 24-27.

Oil Heat Institute of America and National Oil Heat Exposition, annual meeting, Commercial Museum, Philadelphia April 24-May 1.

American Petroleum Institute, Division of Production, eastern district meeting, Cleveland Hotel, Cleveland, April 26-28.

May

American Petroleum Institute, Division of Refining, midyear meeting, Hotel Cleveland, Cleveland, May 1-4.

Interstate Oil Compact Commission, spring meeting, Biloxi, Miss., May 4-6.

National Stripper Well Association, Biltmore Hotel, Los Angeles, May 7-9.

Independent Petroleum Association of America, midyear meeting, Biltmore Hotel, Los Angeles, May 7-9.

American Gas Association, Natural Gas Department, spring meeting, Mayo Hotel, Tulsa, May 8-9.

Liquefied Petroleum Gas Association, annual convention, Palmer House, Chicago, May 8-11.

American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, May 11-12.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each monih, Jonathan Club.

New York Nomads: April 3, May 10 (annual invitation dinner), all at Louis Sherry's, and June 13-15, golf party, Wesichester.

LEGAL

NOTICE OF SALE: Notice is hereby given that the Department of Banking of the State of Nebraska as the duly authorized and acting receiver of the Midland Savings Bank of Lincoln, Nebraska, will sell the following described real estate, without reservation of mineral or other rights, but subject to all existing grazing leases, at public auction at the main entrance to the Harris County Courthouse at Houston, Texas, at 2:00 P. M. on Wednesday, the 19th day of April, 1950: Four Hundred Twenty-Two (422) acres of land in Section Eight (8), Block Six (6), I. & G. N. R. R. Company Survey described by metes and bounds according to the E. N. Gustafson Survey of February 7th, 1913, as follows: BEGINNING on the bank of East Carancahua Creek where the lower or South line of said Section Eight (8) intersects said Creek; THENCE East 2295.2 feet; THENCE North 2241.3 feet; THENCE East 2602 feet; THENCE North 1992 feet; THENCE West 5785 feet; THENCE South 2180 feet; THENCE WEST to East Carancahua Creek and down its meanders to the place of beginning; all of said land being located in Matagorda County, Texas. The sale of said land will be held open for one (1) hour. The property will be sold to the highest bidder therefore, whose bid must be reduced to writing and must be accompanied by a certified check or cash in the amount of at least fifty per cent (50%) of the bid price. The receiver reserves the right to reject all bids, and all bids shall be subject to confirmation by the District Court of Lancaster County, Nebraska. In the event of such confirmation the receiver shall deliver a standard receiver's deed to the purchaser, without warranty of any nature whatsoever, conveying the fee simple title to said property to the purchaser, specifically subject to all encumbrances and restrictions of record, and to all existing grazing leases. At said time receiver shall also deliver such abstracts of title to the property as it now has in its possession. Upon the delivery of said deed the purchaser shall simultaneously therewith pay to said receiver or its duly authorized agent the balance of the purchase price. THE DEPARTMENT OF BANKING OF THE STATE OF NEBRASKA, Receiver of the Midland Savings Bank, Lincoln, Nebraska, By: BEGHTOL & RANKIN, Its Attorneys, 714 Stuart Building, Lincoln, Nebraska.

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BRANDS

are important!

Cattle are branded primarily to prove ownership.
But, experienced cattlemen and livestock buyers know that
some brands are always found on higher quality animals.
These brands come from better feed and water,
from better breeding stock, from better handling.
The HAZARD brand on a reel of wire rope is your assurance of quality—
quality backed by wire rope manufacturing experience
dating back to 1846. Next time specify HAZARD.
Remember— ***"Brands are important!"***

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